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# LEPIDOPTERA INDICA.

BY

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AND OF THE BRITISH ORNITHOLOGISTS' UNION.

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## RHOPALOCERA.

FAMILY PAPILIONIDÆ.

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FAMILY LYCÆNIDÆ.

SUB-FAMILIES GERYDINÆ, LYCÆNOPSINÆ AND EVERINÆ.

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Biology

## DESCRIPTION OF PLATES.

PLATE	PAGE	PLATE	PAGE
PLATE 551.		PLATE 561.	
Fig. 1, 1a, ♂ (Wet-season Brood), 1b, c, ♂ (Dry-season Brood). Lade Lalassis	1	Fig. 1, 1a, b, ♂, 1c, d, ♀. Dercas Wallachii	29
Fig. 2, 2a, ♂, 2b, c, ♀ (Wet-season Brood), 2d, e, ♂ (Extreme Dry Brood). Catophaga Adamsoni	4	Fig. 2, 2a, ♂. Dercas Lycorias	30
PLATE 552.		PLATE 562.	
Fig. 1, 1a, ♂, 1b, c, ♀ (Wet-season Brood), 1d, e, f, g, ♂, h, i, ♀ (Dry-season Brood). Catophaga Wardii	3	Fig. 1, 1a, b, c, ♂, d, e, ♀. Dercas Doubledayi	31
PLATE 553.		PLATE 563.	
Fig. 1, 1a, ♂, 1b, c, ♀ (Wet-season Brood), 1d, e, ♂, 1f, g, ♀ (Dry-season Brood). Catophaga Galathea	6	Fig. 1, ♂, 1a, ♀ (Wet-season Brood). Gandaca Assamica	33
PLATE 554.		Fig. 2, ♂, 2a, b, ♀ (Dry-season Brood).	
Fig. 1, 1a, ♂, 1b, c, ♀ (Wet-season Brood), 1d, e, ♂, 1f, g, ♀ (Dry-season Brood). Catophaga Paulina	7	Fig. 3, ♂, 3a, ♀ (Wet-season Brood), 3b, ♂, 3c, ♀ (Dry-season Brood). Gandaca Burmana	34
PLATE 555.		Fig. 4, 4a, ♀ (Wet-season Brood), 4b, ♂, 4c, ♀ (Dry-season Brood). Gandaca Andamana	35
Fig. 1, 1a, b, ♂ (normal males), 1c, d, h, i, (Wet-season Brood), ♀ 1e, f, g, ♀ (Dry-season Brood), 1j, k, ♀ (Extreme Dry). Catophaga Galene	9	PLATE 564.	
PLATE 556.		Fig. 1, 1a, ♂, 1b, ♀ (Wet-season Brood), 1c, d, ♂, 1e, ♀ (Intermediate form), 1f, ♂, 1g, ♀ (Dry-season Brood). Kibreeta Libythea	36
Fig. 1, Larvae and Pupae; 1a, b, c, ♂, 1d, e, f, g, h, i, j, ♀. Catophaga Swinhoei	11	Fig. 2, 2a, ♂, 2b, c, ♀ (Wet-season Brood), 2d, ♂, 2e, ♀ (Intermediate form), 2f, ♂, 2g, ♀ (Dry season Brood). Kibreeta Rubella	38
PLATE 557.		PLATE 565.	
Fig. 1, 1a, ♂, 1b, c, ♀ (Wet-season Brood), 1d, ♂, e, f, ♀ (Dry-season Brood), 1g, ♂, h, i, ♀ (Extreme Dry Brood). Catophaga Darada	12	Fig. 1, 1a, b, ♂ ♀ (Wet-season Brood). Nirmula Venata	40
PLATE 558.		Fig. 2, 3a, b, ♂ ♀ (Wet-season Brood), 3c, d, ♂ ♀ (Dry-season Brood). Nirmula Rama	42
Fig. 1, 1a, ♂, 1b, c, ♀. Saletara Chrysaea	15	Fig. 4, 4a, b, ♂ ♀. Nirmula Sikkima	43
Fig. 2, 2a, ♂ (Wet-season Brood), 2c, d, ♂ (Dry-season Brood). Tachyris Galba	17	PLATE 566.	
PLATE 559.		Fig. 1j, k, l, m, ♂. Nirmula Pseudolæta	44
Fig. 1, 1a, b, ♀. Leptosia Xiphia	20	Fig. 1, 1a, b, c, d, e, f, ♂ ♀ (Wet-season Brood), 1g, h, i, ♂ ♀ (Dry-season Brood). Nirmula Laeta	44
Fig. 2, 2a, b, c, d, ♂, 2e, f, g, ♀. Colias Nepalensis	24	PLATE 567.	
PLATE 560.		Fig. 1, 1a, b, c, d, e, ♂ ♀ (Wet-season Brood), f, g, h, i, ♂ ♀ (Dry-season Brood). Terias Hecabe	50
Fig. 1, 1a, ♂, 1b, c, ♀. Colias Zaneka	25	Fig. 2, aberrant; var. curiosa	52
Fig. 2, 2a, ♂, 2b, c, ♀. Colias Zanekoides	27		

PLATE	PAGE	PLATE	PAGE
568.		574.	
Fig. 1, 1a, ♂, b, ♀ (Wet-season Brood). Fig. 2, 2a, ♂, 2b, ♀ ((Dry-season Brood). Terias Purreea . . . . .	56	Fig. 1, ♂ (Wet-season Brood), 1a, b, ♂ ♀ (Dry-season Brood), Terias Frateria . . . . .	72
Fig. 3, 3a, ♂, 3b, ♀. Terias Excavata . . . . .	57	Fig. 2, ♂ (Wet-season Brood), a, b, ♂ ♀ (Dry-season Brood), c, ♂ (Intermediate Dry form), 2d, ♂ (Extreme Dry-season Brood). Terias Patruelis . . . . .	73
Fig. 4, 4a, ♂, 4b, ♀. Terias Fimbriata . . . . .	58	Fig. 3, 3a, b, ♂ ♀ (Wet-season Brood), 3c, ♂ ♀ (Dry-season Brood). Terias Nikobariensis . . . . .	74
Fig. 5, 5a, ♂ (Dry-season Brood). Terias Irregularis . . . . .	58		
569.		575.	
Fig. 1, ♂ (Wet-season Brood), 1a, ♂, 1b, ♀, 1c, ♂, d, ♀ (Dry-season Brood). Terias AEsiopeoides . . . . .	60	Fig. 1, ♂, 1a, ♀. Terias Blairiana . . . . .	75
Fig. 2, ♂ (Wet-season Brood), 2a, b, ♂ ♀ (Dry-season Brood), 2c, ♀ (Extreme Dry-season Brood). Terias Swinhonis . . . . .	61	Fig. 2, ♂ (Wet-season Brood), 2a, b, ♂ ♀ (Dry-season Brood), 2c, ♀ (Extreme Dry-season Brood). Terias Andamana . . . . .	75
Fig. 3, 3a, ♂ ♀ (Wet-season Brood), 3b, ♂ (Dry-season Brood), 3c, ♀ (Extreme Dry-season Brood). Terias Asphodelus . . . . .	62	Fig. 3, ♂, 3a, ♀ (Dry-season Brood). Terias Repstoerflü . . . . .	76
		Fig. 4, ♂, 4a, ♀ (Dry-season Brood). Cadellii . . . . .	77
		Fig. 5, ♂, Terias Moorei . . . . .	77
570.		576.	
Fig. 1, 1a, ♂ ♀ (Wet-season Brood), 1b, c, ♂ ♀ (Intermediate form), d, e, ♂ ♀ (Dry-season Brood), f, g, ♂ ♀ (Extreme Dry-season Brood). Terias Davidsonii . . . . .	63	Fig. 1, 1a, ♂ ♀ (Wet-season Brood), 1b, Larva and Pupa, 1c, d, ♀ (Extreme Wet-season Brood), 1e, f, ♂ ♀ (Dry-season Brood), 1g, h, ♀ (Extreme Dry-season Brood). Catopsilia Crocale . . . . .	84
571.		577.	
Fig. 1, ♂ (Wet-season Brood), 1a, ♀ (Intermediate form), b, c, ♂ ♀ (Dry-season Brood), d, ♀ (Extreme Dry-season Brood). Terias Citrina . . . . .	65	Fig. 1, 1a, ♂ ♀ (Wet-season Brood), 1b, Larva and Pupa, 1c, d, ♂ ♀ (Dry-season Brood), 1e, f, g, ♂ ♀ (Extreme Dry-season Brood). Catopsilia Pyranthe . . . . .	90
Fig. 2, ♂, 2a, ♀ (Wet-season Brood), 2b, c, ♂ ♀ (Dry-season Brood). Terias Rotundalis . . . . .	66		
Fig. 3 ♂ (Wet-season Brood), 3a, b, ♂ ♀ (Dry-season Brood). Terias Uniformis . . . . .	67		
572.		578.	
Fig. 1, 1a, ♂ ♀ (Wet-season Brood), 1b, ♀ (Dry-season Brood). Terias Grandis . . . . .	67	Fig. 1, 1a, b, ♂ ♀ (Wet-season Brood). Catopsilia Aleyone . . . . .	94
Fig. 2, ♂ (Wet-season Brood), 2a, ♂, b, ♀ (Dry-season Brood), 2c, d, ♂, 2e, ♀ (Extreme Dry-season Brood). Terias Silhetana . . . . .	68	Fig. 2, ♂, 2a, b, ♀. Catopsilia Scylla . . . . .	95
573.		579.	
Fig. 1, 1a, ♂ ♀ (Wet-season Brood), 1b, c, ♂ ♀ (Dry-season Brood), 1d, e, ♂ ♀ (Extreme Dry-season Brood). Terias Kana . . . . .	69	Fig. 1, 1a, 1b, ♂ ♀ (Wet-season Brood), 1c, ♀, 1d, ♂ (Dry-season Brood), 1e, 1g, ♀, 1f, ♂ (Extreme Dry-season Brood). Ixias Pyrene . . . . .	99
Fig. 2, ♂ (Wet-season Brood), 2a, b, ♂ ♀ (Dry-season Brood). Terias Andersoni . . . . .	71		
Fig. 3, ♂ (Wet-season Brood), 3a, b, ♂ ♀ (Dry-season Brood), 3c, d, ♂ ♀ (Extreme Dry-season Brood). Terias Merguiana . . . . .	71		
		580.	
		Fig. 1, 1a, ♂ ♀ (Wet-season Brood), 1b, ♂, 1c, ♂, 1d, ♂ ♀ (Dry-season Brood), 1e, 1f, 1g, ♂ ♀ (Extreme Dry-season Brood). Ixias Satadra . . . . .	100
		581.	
		Fig. 1, 1a, ♂ ♀ (Wet-season Brood), 1b, ♂, 1d, ♂, 1c, ♀ (Extreme Dry-season Brood). Ixias Kausala . . . . .	102

## DESCRIPTION OF PLATES.

vii

	PAGE		PAGE
<b>PLATE 582.</b>			
Fig. 1, 1a, ♂, ♀ ( <i>Wet-season Brood</i> ), 1b, 1c, ♂ ♀ ( <i>Intermediate form</i> ), 1d, 1e, ♂ ♀ ( <i>Dry-season Brood</i> ), 1f, 1g, ♂ ♀ ( <i>Extreme Dry-season Brood</i> ). <i>Ixiias Dharmasalae</i> . . .	104	<b>PLATE 591.</b>	
			Fig. 1, ♂, 1a, ♀ ( <i>Wet-season Brood</i> ), 1b, ♂, 1c, ♀ ( <i>Dry-season Brood</i> ). 1d, 1e, Larva and Pupa. <i>Hebomoia Glau- cippe</i> . . . . .
			123
<b>PLATE 583.</b>			
Fig. 1, 1a, 1b, 1c, ♂ ♀ ( <i>Wet-season Brood</i> ), 1d, 1e, 1f, 1g, ♂ ♀ ( <i>Dry-season Brood</i> ), 1h, 1i, 1j, 1k, ♂ ♀ ( <i>Extreme Dry-season Brood</i> ). <i>Ixiias Piren- assa</i> . . . . .	106	<b>PLATE 592.</b>	
			Fig. 1, 1a, ♂ ♀ ( <i>Dry-season Brood</i> ). <i>Hebo- moia Australis</i> . . . . .
			125
			Fig. 2, ♂, 2c, ♀ ( <i>Wet-season Brood</i> ), 2b, ♂, 2a, ♀ ( <i>Dry-season Brood</i> ). <i>Hebomoia Reipstorfi</i> . . . . .
			126
<b>PLATE 584.</b>			
Fig. 1, 1a, ♂ ♀ ( <i>Wet-season Brood</i> ), 1b, 1c, ♂ ♀ ( <i>Extreme Wet-season Brood</i> ), 1d, 1e, ♂ ♀ ( <i>Dry-season Brood</i> ), 1f, 1g, ♂ ♀ ( <i>Extreme Dry- season Brood</i> ). <i>Ixiias Frequens</i> .	107	<b>PLATE 593.</b>	
			Fig. 1, 1a, ♂ ♀ ( <i>Wet-season Brood</i> ), 1b, ♂ ( <i>Albino</i> ), 1c, ♂, 1d, ♀ ( <i>Under- side Wet form</i> ), 1e, ♂, 1f, ♀, 1h, ♀ ( <i>Dry-season Brood</i> ), 1g, ♀ ( <i>Albino</i> ), 1i, 1j, ♂ ♀ ( <i>Extreme Dry-season Brood</i> ), 1k, ♂, 1l, ♀ ( <i>Under- side Extreme form</i> ). <i>Callosune Eucharis</i> . . . . .
			129
<b>PLATE 585.</b>			
Fig. 1, 1a, 1b, ♂ ♀ ( <i>Wet-season Brood</i> ), 1c, 1d, 1e, 1f, ♂ ♀ ( <i>Dry-season Brood</i> ). <i>Ixiias Cingalensis</i> . . . .	108	<b>PLATE 594.</b>	
			Fig. 1, ♂, 1a, ♀ 1b, ♂, 1c, ♀ ( <i>Wet-season Brood</i> ), 1d, ♂, 1e, ♀ ( <i>Intermediate Brood</i> ), 1f, ♂, 1g, ♀, 1h, ♂, 1i, ♀ ( <i>Dry-season Brood</i> ), 1j, ♂, 1k, ♀ ( <i>Winter form</i> ), 1l, ♂, 1m, ♀ ( <i>Ex- treme Dry-season Brood</i> ). <i>Callo- sune Etrida</i> . . . . .
			132
<b>PLATE 586.</b>			
Fig. 1, 1a, 1b, ♂ ♀ ( <i>Wet-season Brood</i> ), 1a, 1b, 1c, ♂ ♀ ( <i>Extreme Wet-season Brood</i> ), 1d, 1e, 1f, 1g, ♂ ♀ ( <i>Dry-season Brood</i> ). <i>Ixiias Andamana</i> .	109	<b>PLATE 595.</b>	
			Fig. 1, ♂, 1a, ♀ ( <i>Wet-season Brood</i> ). <i>Callosune Limibata</i> . . . . .
			135
			Fig. 2, ♂, 2a, ♀, 2b, ♂, 2c, ♀ ( <i>Wet-season Brood</i> ), 3, ♂, 3a, ♀ ( <i>Dry-season Brood</i> ), 4, ♂, 4a, ♀, 4b, ♂, 4c, ♀ ( <i>Extreme Dry-season Brood</i> ). <i>Callo- sune Danaë</i> . . . . .
			136
<b>PLATE 588.</b>			
Fig. 1, ♂, 1e, ♀ ( <i>Wet-season Brood</i> ), 1b, ♂, 1c, ♀ ( <i>Dry-season Brood</i> ), 1a, 1d, ♂ ♀ ( <i>Extreme Dry-season Brood</i> ). <i>Ixiias Moulmeinensis</i> .	113	<b>PLATE 596.</b>	
			Fig. 1, ♂, 1a, ♀, 1b, ♂, 1c, ♀ ( <i>Wet-season Brood</i> ), 1d, ♂, 1e, ♀, 1f, ♂ ( <i>Inter- mediate form</i> ), 1g ( <i>Immaculate form</i> ), 1h, ♂, 1i, ♀, 1j, ♂, 1k, ♀ ( <i>Dry-season Brood</i> ). <i>Callosune Dulcis</i> . . . . .
			138
<b>PLATE 589.</b>			
Fig. 1, 1a, ♂ ♀ ( <i>Wet-season Brood</i> ), 1b, ♂, 1c, 1d, 1e, ♀ ( <i>Dry-season Brood</i> ), 1f, 1g, ♂ ♀ ( <i>Extreme Dry- season Brood</i> ). <i>Ixiias Marianne</i> .	115	<b>PLATE 597.</b>	
			Fig. 1, ♂, 1a, ♀, 1b, ♂, 1c, ♀ ( <i>Dry-season Brood</i> ), 1d, ♂, 1e, ♀, 1f, ♂, 1g, ♀ ( <i>Wet-season Brood</i> ), 1h, ♂, 1i, ♀ ( <i>Extreme Dry-season Brood</i> ). <i>Callo- sune Subroseus</i> . . . . .
			140
<b>PLATE 590.</b>			
Fig. 1, 1a, ♂ ♀ ( <i>Wet-season Brood</i> ), 1b, 1c, ♂ ♀ ( <i>Dry-season Brood</i> ), 1d, 1e, ♂ ♀ ( <i>Extreme Dry-season Brood</i> ). <i>Ixiias Nola</i> . . . . .	117		
Fig. 2, ♂, 2a, ♀. <i>Euchloë Daphalis</i> . . . .	120		
Fig. 3, ♂, 3a, ♀. <i>Euchloë Lucilla</i> . . . .	121		

PLATE	PAGE	PLATE	PAGE
598.		604.	
Fig. 1, ♂, 1a, ♀, 1b, ♂, 1c, ♀ (Wet-season Brood), 1d, ♀ (Albino), 1e, ♂, 1f, ♀ (Dry-season Brood). Colotis Cypraea . . . . .	142	Fig. 1, ♂, 1a, ♀, 2, ♀. Eurymus Berylla . . . . .	160
Fig. 2, ♂, 2a, ♀ (Wet-season Brood), 2b, ♀, 2c, ♀ (Dry-season Brood). Colotis Dynamine . . . . .	144	Fig. 3, ♂, 3a, ♀ (Wet-season Brood), 3b, ♂ (Dry-season Brood). Colotis Modestus . . . . .	143
Fig. 4, ♂, 4a, ♀ (Wet-season Brood), 4b, ♂, 4c, ♀ (Dry-season Brood). Eurymus Miranda . . . . .	167	Fig. 5, ♂, 5a, ♀. Eurymus Alpherakii . . . . .	163
Fig. 6, ♂, 6a, ♀. Eurymus Dubia . . . . .	167		
599.		605.	
Fig. 1, ♂, 1a, ♀, 1b, ♂. Colotis Protractus . . . . .	146	Fig. 1, ♂, 1a, ♀. Eurymus Wiskotti . . . . .	170
Fig. 2, ♂, 2a, ♀, 2b, ♀, 2c, ♀ (Albino). Colotis Phisalia . . . . .	147	Fig. 2, ♂, 2a, ♀, 2b, ♀. Eurymus Eugene . . . . .	165
Fig. 3, ♂, 3a, ♀, 3b, ♂, 3c, ♀ (Wet-season Brood), 3d, ♂, 3e, ♀, 3f, ♂, 3g, ♀ (Dry-season Brood). Colotis Puellaris . . . . .	149	Fig. 3, ♂, 3a, ♀, 3b, ♀. Eurymus Stoliczkanus . . . . .	166
		Fig. 4, ♂, 4a, ♀, 4b, ♀ (Wet-season Brood), 4c, ♂, 4d, ♀ (Dry-season Brood), 4e, ♀ (Extreme Dry-season Brood). Eurymus Fieldi . . . . .	171
600.		606.	
Fig. 1, ♂, 1a, ♀, 1b, ♂, 1c, ♀ (Wet-season Brood), 1d, ♂, 1e, ♀ (Dry-season Brood). Colotis Vestalis . . . . .	150	Fig. 1, ♂, 1a, ♀, 1b, ♂, 1c, ♀ (Wet-season Brood), 1d, ♂, 1e, ♀ (Dry-season Brood). Pareronia Avatar . . . . .	174
Fig. 2, ♂, 2a, ♀, 2b, ♂, 2c, ♀ (Wet-season Brood), 2d, ♂, 2e, ♀, 2f, ♂, 2g, ♀ (Dry-season Brood). Colotis Intermisus . . . . .	151		
601.		607.	
Fig. 1, ♂, 1a, ♀, 1b, ♂ (Wet-season Brood), 1c, ♂, 1d, ♀ (Dry-season Brood), 1e, ♀ (Albino). Madais Fausta . . . . .	153	Fig. 1, ♂, 1a, ♀, 1b, ♂, 1c, ♀ (Wet-season Brood), 1d, ♂, 1e, ♀ (Dry-season Brood), 1g, ♀ (Extreme Dry-season Brood), 1h, Larvae, 1i, Pupa. Pareronia Hippia . . . . .	175
Fig. 2, ♂, 2a, ♀, 2b, ♂ (Wet-season Brood), 2c, ♂, 2d, ♀, 2e, ♂ (Dry-season Brood). Madais Fulvia . . . . .	154		
602.		608.	
Fig. 1, ♂, 1a, ♀, 1b, ♂ (Wet-season Brood), 1c, ♀ (Albino), 1d, ♂, 1e, ♀ (Dry-season Brood). Eurymus Erata . . . . .	157	Fig. 1, ♂, 1a, ♀, 1b, ♂, 1c, ♀ (Wet-season Brood), 1d, ♂, 1e, ♀, 1f, ♂, 1g, ♀ (Dry-season Brood). Pareronia Pingasa . . . . .	177
Fig. 2, ♂, 2a, ♀ (Wet-season Brood), 2b, ♂, 2c, ♀, 2d, ♂ (Dry-season Brood). Eurymus Glicia . . . . .	159		
603.		609.	
Fig. 1, ♂, 1a, ♀, 1c, ♀ (Wet-season Brood), 1b, ♂ (Dry-season Brood). Eurymus Nilagiriensis . . . . .	161	Fig. 1, ♂, 1a, ♀, 1b, ♂, 1c, ♀ (Wet-season Brood), 1d, ♂, 1e, ♀, 1f, ♂, 1g, ♀ (Dry-season Brood). Pareronia Naraka . . . . .	179
Fig. 2, ♂, 2a, ♀, 2c, ♀ (Wet-season Brood), 2b, ♂, 2d, ♀ (Dry-season Brood). Eurymus Chrysodona . . . . .	160		
Fig. 3, ♂, 3a, ♀. Eurymus Shipkee . . . . .	162	PLATE 610.	
		Fig. 1, ♂, 1a, ♀, 1b, ♂, 1c, ♀ (Wet-season Brood), 1d, ♂, 1e, ♀, 1f, ♂, 1g, ♀ (Dry-season Brood). Pareronia Ceylanica . . . . .	180
		PLATE 611.	
		Fig. 1, ♂, 1a, ♀, 1b, ♂, 1c, ♀ (Wet-season Brood), 1d, ♂, 1e, ♀, 1f, ♂, 1g, ♀ (Dry-season Brood). Pareronia Fraterna . . . . .	181

DESCRIPTION OF PLATES.

ix

PLATE	NAME	PAGE	PLATE	NAME	PAGE
612.	Fig. 1, ♂, 1a, ♀, 1b, ♀. <i>Gerydus Symethus</i>	187	620.	Fig. 1, ♂, 1a, ♀, 1b, ♂ (Wet-season Brood), 1c, ♂, 1d, ♀, 1e, ♀ (Dry-season Brood). <i>Lycænopsis Transpectus</i>	207
	Fig. 2, ♂, 2a, ♀, 2b, ♂, 2c, ♀. <i>Gerydus Ancon</i>	188		Fig. 2, ♂, 2a, ♀, 2b, ♀ (Wet-season Brood), 2c, ♂, 2d, ♀, 2e, ♂ (Dry-season Brood). <i>Lycænopsis Puspa</i>	208
613.	Fig. 1, ♂, 1a, ♀, 1b, ♂ (Wet-season Brood), 1c, ♂, 1d, ♀, 1e, ♀ (Dry-season Brood). <i>Gerydus Boisduvali</i>	189	621.	Fig. 1, ♂, 1a, ♀, 1b, ♂. <i>Lycænopsis Lilacea</i>	210
	Fig. 2, ♂, 2a, ♀, 2b, ♂, 2c, ♀. <i>Gerydus Longeana</i>	190		Fig. 2, ♂, 2a, ♀. <i>Lycænopsis Cyanescens</i>	211
614.	Fig. 1, ♂, 1a, ♀, 1b, ♂, 1c, ♀. <i>Gerydus Crotone</i>	191		Fig. 3, ♂, 3a, ♀, 3b, ♂ (Wet-season Brood), 3c, ♂, 3d, ♀ (Dry-season Brood). <i>Lycænopsis Huegelii</i>	212
	Fig. 2, ♂, 2a, ♀, 2b, ♂, 2c, ♀. <i>Gerydus Bigsii</i>	192	622.	Fig. 1, ♂, 1a, ♀, 1b, ♂. <i>Lycænopsis Celestina</i>	213
	Fig. 3, 3a, ♂. <i>Gerydus Assamensis</i>	193		Fig. 2, ♂, 2a, ♀, 2b, ♂ (Wet-season Brood), 2c, ♂, 2d, ♀ (Dry-season Brood). <i>Lycænopsis Sikkima</i>	214
615.	Fig. 1, ♂, 1a, ♀, 1b, ♂, 1c, ♀. <i>Allotinus Drumila</i>	194		Fig. 3, ♂, 3a, ♀, 3b, ♂. <i>Lycænopsis Victoria</i>	215
	Fig. 2, ♂, 2a, ♀, 2b, ♂, 2c, ♀. <i>Allotinus Multistrigatus</i>	195	623.	Fig. 1, ♂, 1a, ♀, 1b, ♀. <i>Lycænopsis Lanka</i>	216
616.	Fig. 1, ♂, 1a, ♀, 1b, ♂. <i>Allotinus Subviolescens</i>	196		Fig. 2, ♂, 2a, ♀, 2b, ♀. <i>Lycænopsis Albidisca</i>	217
	Fig. 2, ♂, 2a, ♀, 2b, ♂. <i>Allotinus Nivalis</i>	197		Fig. 3, ♂, 3a, ♀, 3b, ♂. <i>Lycænopsis Limbata</i>	218
	Fig. 3, ♂, 3a, ♀, 3b, ♂, 3c, ♀. <i>Allotinus Panormis</i>	197	624.	Fig. 1, ♂, 1a, ♀, 1b, ♂ (Wet-season Brood), 1c, ♂, 1d, ♀, 1e, ♀ (Dry-season Brood). <i>Lycænopsis Marginata</i>	219
617.	Fig. 1, ♂, 1a, ♀, 1b, ♂, 1c, ♀. <i>Allotinus Horsfieldi</i>	198		Fig. 2, ♂, 2a, ♀, 2b, ♂, 2c, ♀. <i>Lycænopsis Placida</i>	220
	Fig. 2, ♂, 2a, ♀, 2b, ♂, 2c, ♀. <i>Allotinus Taras</i>	199	625.	Fig. 1, ♂, 1a, ♀, 1b, ♂. <i>Lycænopsis Jyntanea</i>	221
618.	Fig. 1, ♂, 1a, ♂. <i>Logania Marmorata</i>	200		Fig. 2, ♂, 2a, ♀, 2b, ♂ (Wet-season Brood), 2c, ♂, 2d, ♀ (Dry-season Brood). <i>Lycænopsis Dilecta</i>	222
	Fig. 2, ♂, 2a, ♀, 2b, ♂, 2c, ♀. <i>Logania Watsoniana</i>	201		Fig. 3, ♂, 3a, ♂. <i>Lycænopsis Metæna</i>	223
	Fig. 3, ♂, 3a, ♀, 3b, ♂, 3c, ♀. <i>Logania Massalia</i>	202	626.	Fig. 1, ♂, 1a, ♀, 1b, ♀. <i>Lycænopsis Akasa</i>	223
619.	Fig. 1, ♂, 1a, ♀, 1b, ♀. <i>Lycænopsis Vardhana</i>	204		Fig. 2, ♂, 2a, ♀, 2b, ♂. <i>Lycænopsis Singalensis</i>	224
	Fig. 2, ♂, 2a, ♂. <i>Lycænopsis Binghami</i>	205		Fig. 3, ♂ (one form), 3a, ♂ (another form), 3b, ♀, 3c, ♂, 3d, ♀. <i>Lycænopsis Albocerulea</i>	225
	Fig. 3, ♂, 3a, ♀, 3b, ♂. <i>Lycænopsis Musinoides</i>	205			
	Fig. 4, ♂, 4a, ♂. <i>Lycænopsis Oreana</i>	206			

## DESCRIPTION OF PLATES.

PLATE	PAGE	PLATE	PAGE
627.		634.	
Fig. 1, ♂, 1a, ♀, 1b, ♂ (Wet-season Brood), 1c, ♂, 1d, ♀ (Dry-season Brood), 1e, Larvae and Pupa. Megisba Malaya . . . . .	228	Fig. 1, ♂, 1a, ♀, 1b, ♂ (Wet-season Brood), 1c, ♂, 1d, ♀, 1e, ♀ (Dry- season Brood), 1f, ♂, 1g, ♀, 1h, ♂ (Extreme Dry-season Brood). Tarucus Theophrastus . . . . .	249
Fig. 2, ♂, 2a, ♀, 2b, ♂ (Wet-season Brood), 2c, ♂, 2d, ♀ (Dry-season Brood), 2e, ♂ (Extreme Dry-season Brood). Neopithecops Zalmora . . . . .	230	Fig. 3, ♂, 3a, ♀, 3b, ♂ (Wet-season Brood), 3c, ♂, 3d, ♀ (Dry-season Brood). Zizera Maha . . . . .	253
628.		635.	
Fig. 1, ♂, 1a, ♀, 1b, ♀. Pithecopus Hylax . . . . .	232	Fig. 1, ♂, 1a, ♀, 1b, ♂ (Wet-season Brood), 1c, ♂, 1d, ♀ (Dry-season Brood). Zizera Ossa . . . . .	255
Fig. 2, ♂, 2a, ♂. Pithecopus Fulgens . . . . .	233	Fig. 2, ♂, 2a, ♀, 2b, ♂ (Wet-season Brood), 2c, ♂, 2d, ♀ (Dry-season Brood). Zizera gaika . . . . .	256
Fig. 3, ♂, 3a, ♀, 3b, ♂ (Imago), 3c (dorsal view of pupa, slightly enlarged), 3d (dorsal view of pupa, highly magnified), 3e (side view of pupa, slightly enlarged). Spalgis Epius . . . . .	234	Fig. 3, ♂, 3a, ♀, 3b, ♂ (Wet-season Brood), 3c, ♂, 3d, ♀ (Dry-season Brood). Zizera lysimon . . . . .	258
629.		636.	
Fig. 1, ♂, 1a, ♀, 1b, ♂. Spalgis Nubilus . . . . .	236	Fig. 1, ♂, 1a, ♀, 1b, ♂ (Wet-season Brood), 1c, ♂, 1d, ♀ (Dry-season Brood). Zizera otis . . . . .	260
Fig. 2, ♂, 2a, ♀, 2b, ♂ (Wet-season Brood), 2c, ♂, 2d, ♀ (Dry-season Brood). Taraka Hamada . . . . .	237	Fig. 2, ♂, 2a, ♀, 2b, ♂. Everes argi- ades . . . . .	263
Fig. 3, ♂, 3a, ♀, 3b, ♂, Imago, 3c, Larva and Pupa. Castalius Ananda . . . . .	238	Fig. 3, ♂, 3a, ♀, 3b, ♂. Everes diporides . . . . .	264
630.		637.	
Fig. 1, ♂, 1a, ♀, 1b, ♂ (Wet-season Brood), 1c, ♂, 1d, ♀, 1e, ♀ (Dry-season Brood), 1f, ♂, 1g, ♀ (Extreme Dry- season Brood). Castalius Rosimon . . . . .	239	Fig. 1, ♂, 1a, ♀, 1b, ♂, 1c, ♀ (Wet-season Brood), 1d, ♂, 1e, ♀ (Dry-season Brood). Everes parrhasius . . . . .	265
Fig. 2, ♂, 2a, ♀, 2b, ♂, Imago, 2c, Larvae and Pupa. Castalius Ethion . . . . .	241	Fig. 2, ♂, 2a, ♀, 2b, ♂. Everes dipora . . . . .	267
631.		Fig. 3, ♂, 3a, ♀, 3b, ♂. Everes kala . . . . .	268
Fig. 1, ♂, 1a, ♀, 1b, ♂, 1c, ♀. Castalius Airavati . . . . .	243	638.	
Fig. 2, ♂, 2a, ♀, 2b, ♂. Castalius Roxus . . . . .	243	Fig. 1, ♂, 1a, ♀, 1b, ♂. Everes potanini . . . . .	268
Fig. 3, ♂, 3a, ♀, 3b, ♂. Castalius Roxana . . . . .	244	Fig. 2, ♂, 2a, ♀, 2b, ♂. Bothriomia cheunellii . . . . .	270
632.		Fig. 3, ♂, 3a, ♀, 3b, ♀ (Wet-season Brood), 3c, ♂, 3d, ♀, 3e, ♂, 3f, ♀, (Dry-season Brood). Chilades laius . . . . .	271
Fig. 1, ♂, 1a, ♀, 1b, ♂. Castalius Manlueña . . . . .	245	639.	
Fig. 2, ♂, 2a, ♀, 2b, ♂ (Wet-season Brood), 2c, ♂, 2d, ♀, 2e, ♀ (Dry-season Brood). Castalius Elna . . . . .	246	Fig. 1, ♂, 1a, ♀, 1b, ♂. Chilades tro- chilus . . . . .	273
633.		Fig. 2, ♂, 2a, ♀, 2b, ♂. Chilades putli . . . . .	275
Fig. 1, ♂, 1a, ♀, 1b, ♂ (Wet-season Brood), 1c, ♂, 1d, ♀ (Dry-season Brood), 1e, ♂, 1f, ♀, 1g, ♀ (Extreme Dry- season Brood). Castalius Decidia . . . . .	247	Fig. 3, ♂, 3a, ♀, 3b, ♂, 3c, Larea and Pupa. Talicada nyseus . . . . .	276
Fig. 2, ♂, 2a, ♀, 2b, ♂. Tarucus Venus . . . . .	252	Fig. 4, ♂, 4a, ♀, 4b, ♂. Talicada kha- siana . . . . .	277

# LEPIDOPTERA INDICA.

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## Sub-family PIERINÆ (continued).

### Genus LADE.

*Lade*, de Nicéville, Journ. Bombay Nat. Hist. Soc. 1898, p. 153.

Male. *Forewing* triangular, costa much arched towards the end, apex somewhat falcate, exterior margin crenulated anteriorly; cell broad. *Hindwing* triangularly-oval, very convex exteriorly. No tufts of hair present at base of the anal claspers; a lengthened rigid intromittent organ generally exserted.

### LADE LALASSIS.

Plate 551, fig. 1, 1a ♂ (*Wet-season Brood*), 1b, c ♂ (*Dry-season Brood*).

*Pieris Lalassis*, Grose-Smith, Ann. and Mag. Nat. Hist. 1887, p. 265; *id.* Rhop. Exot. ii. P. pl. 2, fig. 1, 2, 3 ♂ (1889).

*Hiposcritia Lalassis*, Adamson, List Burn. Butt. 1897, p. 44.

*Hiposcritia Lalassis*, Butler, Ann. Nat. Hist. 1898, p. 395.

*Lade Lalassis*, de Nicéville, Journ. Bombay Nat. Hist. Soc. 1898, p. 153.

*Pieris Indroides*, Honrath, Berl. Ent. Zeit. 1889, p. 403 (*woodcut fig.*).

*Hiposcritia Lucasii*, var. *Lalassis*, Fruhstorfer, Deuts. Ent. Zeit. 1902, p. 284.

*Wet-season form.* Male. Upperside greyish-white. *Forewing* with the costa narrowly edged with grey-black scales; a broad black-scaled apical-marginal band decreasing much in width to or near the lower median veinlet, its inner edge being more or less defined, and irregular from below the subcostal; a small more or less ill-defined black-scaled discal spot between the upper and middle median veinlet, and a smaller blacker spot on middle of the lower discocellular veinlet. *Hindwing* unmarked. Underside. *Forewing* with the apical band irrorated with brownish-ochreous scales, the discal and discocellular spot prominently black, the latter larger than on upperside. *Hindwing* irrorated with brown scales, and traversed by an ill-defined darker-scaled discal and a submarginal zigzag fascia.

Female. Unknown.

Expanse, ♂ 3 to  $3\frac{1}{4}$  inches.

vol. VII. September 19th, 1905.

*Dry-season Form.* Male. Upperside. Forewing with a much narrower black-scaled apical-marginal band, and a more or less obsolescent discal spot, the latter being sometimes quite obsolete; the discocellular black spot much smaller. Underside similar to *wet-season* form, the apex of *forewing*, and the *hindwing*, being much paler brown scaled.

Female. Unknown.

Expanse, ♂  $2\frac{1}{2}$  to  $2\frac{3}{4}$  inches.

HABITAT.—Lower Burma; Tenasserim; Malay Peninsula.

DISTRIBUTION.—The type specimens described and figured by Mr. H. Grose-Smith were taken by Col. C. H. E. Adamson at Thounya Sekkan, Upper Tenasserim, who writes “numerous specimens were taken by me on April 24th” (List p. 44). Col. Adamson also obtained specimens in the same locality on February 16th. We have examined the types, and other specimens, both of the *wet* and *dry* form, and we find that all prove to be males, as is evidently the fact by their having the intromittent organ exserted at base of the anal valves. In Mr. Grose-Smith’s collection is a male of the *wet* form, taken by Mr. T. C. Hauxwell in April, in the Dounat Range, Middle Tenasserim; Dr. Leonarda Fea obtained it in the Karen Hills.

The type of *Indroides*, Hagen, is recorded from Perak, Malay Peninsula.

#### Genus CATOPHAGA.

*Catophaga*, Hübner, Verz. bek. Schmett. p. 93 (1816). Moore, Lep. of Ceylon i. p. 131 (1881).

Butler, Ann. Nat. Hist. 1898, p. 395.

*Tachyris* (group A. pt.) Wallace, Trans. Ent. Soc. 1867, p. 363.

*Appias* (pt.), Distant, Rhop. Malayana, p. 310 (1885).

*Appias* (sect. *Catophaga*, pt.), Watson, Journ. Bombay Nat. Hist. Soc. 1894, p. 499.

IMAGO.—Male. Forewing triangular, apex obtusely pointed; costal vein extending a little over half length of the margin; first subcostal branch emitted at one-third and second at one-fifth before end of the cell, the third bifid, the fourth at one-fourth before the apex, the fifth (or upper radial) at one-fifth beyond the cell; upper and lower discocellular concave, the lower radial from their angle; middle median branch at one-fourth and lower median beyond one-half before end of the cell; submedian vein recurved. Hindwing triangularly-oval; exterior margin oblique, very convex anteriorly, anal angle somewhat prolonged; precostal vein short, curved; subcostal somewhat bent at the base of precostal; first subcostal at one-third before end of the cell; discocellulars very oblique, nearly straight; middle median at one-fifth, lower at one-third before end of the cell; submedian vein straight, internal much recurved. Body moderate; thorax stout, hairy above; palpi hairy beneath, extending half beyond the eyes, third joint long, slender; legs long,

slender. *Antennæ* with a rather short flattened club. Anal valves with a basal lateral-tuft of hairs beneath; intromittent organ usually exserted.

TYPE.—*C. Paulina.*

**CATOPHAGA WARDII.**

Plate 552.

*Catophaga Wardii*, Moore, Journ. Asiatic Soc. Bengal, 1884, p. 43, ♂ ♀. Hampson, Journ. As. Soc. Beng. 1888, p. 362. Watson, Journ. Bombay Nat. Hist. Soc. 1894, p. 499. Butler, Ann. Nat. Hist. 1898, p. 398. Fruhstorfer, Deuts. Ent. Zeit. 1902, p. 288.

*Appias (Catophaga) Wardii*, Davidson and Aitken, Journ. Bombay Nat. Hist. Soc. 1896, p. 574.  
*Appias Wardii*, de Nicéville, Journ. As. Soc. Beng. 1900, p. 256.

*Wet-season Brood* (Plate 552, fig. 1, 1a ♂, 1b, c ♀).

Male. Upperside greyish-white. *Forewing* with a broad black apical marginal band extending outwardly from middle of the costa to the submedian at the posterior angle, the inner edge of the band is excavated angularly outward beyond the cell beneath the lower subcostal veinlet to the upper median, and is then concave between the middle and lower median, below which the band is imperfect and decreasingly terminates at the submedian; the band is traversed by a curved subapical row of five white spots; basal area of the wing broadly grey and sparsely speckled with minute black scales along base of the costa. *Hindwing* with the outer marginal series of broad more or less confluent dentated black spots decreasing in size and width from the apex, the anal area being slightly speckled with black scales; basal area pale grey scaled. Underside. *Forewing* greyish-white; apex pale yellow, with a black narrow subapical band extending from middle of the costa to posterior angle as on upperside. *Hindwing* uniformly pale yellow throughout.

Female. Upperside greyish-white. *Forewing* with a broader but similar excavated black outer band than in male, the posterior end being entirely black to the submedian vein, the band with three upper subapical white spots, the two lower minute or absent; basal area also darker grey and blackish scaled. *Hindwing* with a broader continuous black outer marginal band, its inner-edge acutely dentated, and inwardly broadly bordered from the lower subcostal veinlet to abdominal margin with greyish-black scales. Underside. *Forewing* with the discal area white, the base pale yellow-tinged, the apex glossy greyish-white, the curved black band broader and more prominent than in the male. *Hindwing* glossy greyish-white, the outer border darkest, the costal edge tinged with pale yellow.

Expanse, ♂  $2\frac{8}{10}$  to 3, ♀  $2\frac{6}{10}$  to  $2\frac{8}{10}$  inches.

*Dry-season Brood* (Plate 552, fig. 1d, e, f, g ♂, h, i ♀).

Male. Upperside of a whiter tint than the *wet* form. *Forewing* with the black

band much less prominent, its apical and lower portions being more or less speckled with white scales, and its inner portion (in *extreme dry* specimens narrower, *as in our figure f*); the subapical white spots less defined, and the upper three more or less elongated; basal area also less grey-scaled. *Hindwing* with the marginal dentate spots much less defined, these being speckled and narrow, showing only at the end of the upper veinlets or are obsolescent, and in *extreme dry* specimens (fig. f.) absent. *Underside.* *Forewing* with the subapical band much less defined, narrower, the basal portion more or less obsolescent, and in *extreme dry* specimens (our fig. 1g) obsolete, the apical area and hindwing paler yellow tinted.

*Female.* *Upperside.* *Forewing* with the outer band somewhat narrower than in *wet* form, and less intensely black, five subapical white spots being present; the basal grey area also narrower. *Hindwing* with narrower marginal black dentate band. *Underside.* *Forewing* similar to the *wet* form, except that the black band is much narrower and less black. *Hindwing* very faintly tinged with pale yellow throughout.

*Expanse*, ♂  $2\frac{4}{10}$  to  $2\frac{8}{10}$ , ♀  $2\frac{6}{10}$  inches.

*HABITAT.*—South India.

*DISTRIBUTION.*—This species is confined to South India. The type specimens were obtained by the late Mr. S. N. Ward at Kunur, Nilgiris. Mr. G. F. Hampson records it from the Nilgiris (J. As. Soc. Bengal, 1888, 362). Messrs. Davidson and Aitken obtained "a few specimens, chiefly in the Southern parts of the Kanara District" (J. Bombay N. H. Soc. 1896, 574).

Of our illustrations on Plate 552, fig. 1, 1a, b, c, are from a male and female of the *Wet-season* form, 1d, e, from a male, and h, i, from a female of the *Dry* form; fig. 1f, g, from a male of the *extreme dry* form from S. India, this latter specimen being erroneously figured in Lep. Ceylon i. pl. 50, fig. 3, as the male of *Neombo*.

#### CATOPHAGA ADAMSONI.

Plate 551, fig. 2, 2a ♂, 2b, c ♀ (*Wet-season Brood*); 2d, e ♂ (*Extreme d. y Brood*).

*Wet-season Brood* (Plate 551, fig. 2, 2a ♂, 2b, c ♀).

*Male.* *Upperside* similar to the S. Indian *C. Wardii*. *Forewing* comparatively more obtuse at the apex than in the male of that species, the apical band somewhat narrower posteriorly, its anterior inner portion also narrower, and its inner costal portion paler grey-scaled, the four subapical white spots more inwardly positioned; basal area also less broadly grey-scaled. *Hindwing* with the outer marginal row of black, disconnected, well-formed dentate spots.

*Underside.* Similar to *wet* form of *C. Wardii*, except that, on the forewing, the subapical black band is incomplete and ill-defined.

Female. Upperside somewhat similar to *wet* form of *Wardii*. *Forewing* with the black outer band extending broadly to the extreme posterior margin, the subapical white spots placed less outwardly-oblique. *Hindwing* with a broad black entirely-continuous outer band; costal and basal area slightly flushed with pale yellow. Underside. *Forewing* with the black subapical band somewhat narrower than in *wet Wardii*; basal area and apical edge yellow-tinted. *Hindwing* white, the veins, costa and extreme outer margin slenderly edged with yellow; traversed by a slightly black-scaled submarginal narrow zigzag fascia, the outer margin being slightly glossy greyish-white.

Expanse, ♂  $2\frac{9}{10}$ , ♀  $2\frac{9}{10}$  inches.

*Dry-season Brood.*

Male. Upperside. *Forewing* similar to the above described *wet* form, but with somewhat narrower black outer band (which is also narrower than in the *dry* form of *Wardii*); the subapical spots larger. *Hindwing* with small ill-defined marginal decreasing spots, or short slender streak at end of the upper veins. Underside paler than in *wet* form. *Forewing* with the discal black quadrate spot only present.

Female. Upperside. *Forewing* with duller and comparatively narrower black outer band than in above described *wet* form, the subapical white spots less distinctly formed. *Hindwing* with a duller black marginal continuous band. Underside. *Forewing* with narrower subapical black band than in above *wet* form. *Hindwing* uniformly white.

Expanse, ♂  $2\frac{4}{10}$  to  $2\frac{6}{10}$ , ♀  $2\frac{6}{10}$  inches.

*Extreme Dry-season Brood* (Plate 551, fig. 2d, e ♂).

Male. Upperside. *Forewing* similar to but with a less prominent black outer band, its inner edge bordering the upper subapical spots being partly obliterated. *Hindwing* with a very few almost invisible minute blackish scales at end of the upper veins. Underside similar to the ordinary *dry* form, the discal black quadrate spot on *forewing* being smaller.

Female. Upperside. *Forewing* very similar to the male. *Hindwing* with a few distinct black scales at end of the upper veins. Underside with the apex of forewing, and the entire hindwing much paler, almost white. *Forewing* with the discal black spot only present.

Expanse, ♂ ♀  $2\frac{3}{10}$  inches.

**HABITAT.**—Burma; Upper Tenasserim.

**DISTRIBUTION.**—Specimens of both sexes of the *wet-season* form, taken in April, in the Thoungyng Valley, Upper Tenasserim, by Mr. T. A. Hauxwell are in Mr. H. Grose-Smith's Collection. A male of the *dry-season* form, taken in the Dounat

Range, Upper Tenasserim, by Col. C. T. Bingham, and from Muong Gnow, Shan States, are in Mr. W. Rothschild's Collection. A male of the *dry* form, taken in Rangoon, is in Col. C. Swinhoe's Collection; a female of the *dry* form (above described) was taken in Arrakan in November by Col. C. H. E. Adamson. A male of the *extreme-dry* season form, taken at Hlaingbeoo, Arrakan, in February, is in Col. C. H. E. Adamson's Collection, and a female from Muong Gnow, Shan States, is in Mr. W. Rothschild's Collection.

Of our illustrations on Plate 551, fig. 2, 2a is from the *wet* season male, fig. 2b, c, from the *wet* season female, both taken in April by Mr. Hauxwell; fig. 2d, e, is from the *extreme dry* form taken in February by Col. Adamson.

#### CATOPHAGA GALATHEA.

Plate 553.

*Pieris Galathea*, Felder, Verh. Zool. Bot. Ges. xii. p. 485, ♂ (1862); *id.* Reiso Novara Lep. ii. p. 165 (1865).

*Tachyris Galathea*, Wallace, Trans. Ent. Soc. 1867, p. 371.

*Appias Galathea*, Moore, Proc. Zool. Soc. 1877, p. 591.

*Tachyris Paulina*, var. *Galathea*, Wood-Mason and de Nicéville, Journ. As. Soc. Bengal, 1881, p. 237; *id. l.c.* 1882, p. 18.

*Catophaga Roepstorffii*, Moore, Journ. As. Soc. Bengal, 1884, p. 44, ♂. Watson, Journ. Bombay Nat. Hist. Soc. 1894, p. 499.

*Wet season Brood* (Plate 553, fig. 1, 1a ♂, 1b, c ♀).

Male. Upperside greyish-white. *Forewing* with the costal base and basal area sparsely dark grey scaled, the costal edge from about its middle and the outer marginal edge to below the middle median veinlet black lined, the apical border with a more or less defined denticulated black-scaled decreasing band (in some specimens wider than in our figure 1), and also a few black scales forming a small patch near the base of lower subcostal veinlet; between the upper and middle median is a more or less defined cluster of black scales. *Hindwing* unmarked. Underside. *Forewing* with the outer discal area greyish-white; the base, costa, and apex tinged with very pale sulphur-yellow; the lower cluster of black scales present as on the upper side. *Hindwing* tinged with very pale ochreous-yellow.

Female. Upperside greyish-white. *Forewing* with the costal base and basal area darker greyish-black scaled, a broad black normal-shaped outer-marginal band extending from middle of costa to posterior angle, and traversed by a series of five white spots, the upper one slender or indistinct, these spots sometimes being very slightly pale yellow-tinted. *Hindwing* with a black outer-marginal continuous dentated band. Underside. *Forewing* with the discal area greyish-white, basal area pale yellow, a

narrow black normal-shaped subapical band paling inward to the middle of the costa, the apical area being deep ochreous-yellow. *Hindwing* uniformly deep ochreous-yellow.

Expanse, ♂ ♀  $2\frac{4}{10}$  to  $2\frac{6}{10}$  inches.

*Dry-season Brood* (Plate 553, fig. 1d, e ♂, 1f, g ♀).

Male. Upperside similar to the *wet* season form, except on the *forewing*, the apical bordering black scales and the lower cluster of scales are obsolescent or absent. Underside similar, the cluster of scales on forewing more or less obsolescent.

Female. Upperside. *Forewing* with the outer black band and the subapical white spots as in the *wet* season form, or, the band is slightly broader and the series of spots more medially disposed. *Hindwing* with similar black marginal continuous band, or a variable macular band composed of smaller decreasing spots.

Underside. Both wings greyish-white. *Forewing* with the base sulphur-yellow, the subapical black band somewhat broader and the apical area greyish.

Expanse, ♂  $2\frac{4}{10}$  to  $2\frac{6}{10}$ , ♀  $2\frac{4}{10}$  inches.

HABITAT.—Nicobars; Andamans.

DISTRIBUTION.—The type specimen, in the Berlin Museum, is recorded by Dr. Felder from the island of Sambelong, Nicobars. Messrs. Wood-Mason and de Nicéville record it from Nankowri and Katschall, and Great Nicobar Island (*l.c.* 1882, 18). Prof. R. Meldola obtained it at "Sambelong" (P.Z.S. 1877, 591). A male in the British Museum is labelled "Kamorta." Col. C. Swinhoe has both sexes from Katschall, and a female from Port Blair, Andamans, the latter taken by Mr. Wimberley. Col. C. T. Bingham has recently received it from the Nicobars and the Andamans.

#### CATOPHAGA PAULINA.

Plate 554.

*Papilio Paulina*, Cramer, Pap. Exot. ii. pl. 110, fig. E, F ♀ (1779). Herbst, Nat. Schmett. v. p. 82, pl. 91, fig. 1, 2 ♀ (1792); *dry form*. Fabricius, Ent. Syst. iii. p. 189 (1793).

*Catophaga Paulina*, Hübner, Verz. bek. p. 93 (1816).

*Thyea Paulina*, Butler, Catal. Fabr. Lep. B.M. p. 205 (1869).

*Appias Paulina*, de Nicéville, Journ. As. Soc. Bengal, 1899, p. 217.

*Catophaga Lankapura*, Moore, Proc. Zool. Soc. 1879, p. 142, ♂ ♀; *id.* Lep. of Ceylon i. p. 133, pl. 50, fig. 4, 4a ♂, pl. 51, fig. 1, 1a ♀ (1881); *wet form*.

*Catophaga Galene*, Moore, Lep. Ceylon i. p. 132, pl. 51, fig. 2, 2a ♂ ♀ (1881); *dry form*.

*Wet-season Brood* (Plate 554, fig. 1, 1a ♂, 1b, e ♀).

Male. Upperside greyish-white. *Forewing* with a narrow costal and a broad apical ill-defined blackish-scaled marginal band, the latter attenuating posteriorly

and ending beyond the lower median veinlet, its inner edge being sinuated; a few paler scales are contiguously clustered between the upper and middle median. *Hindwing* with a more or less slightly-defined marginal small cluster of blackish scales at end of the veins. Underside. *Forewing* white, the costal border narrowly and the apex broadly pale ochreous-yellow. *Hindwing* uniformly pale ochreous-yellow.

Female. Upperside greyish-white, the hindwing being very faintly tinted with pale yellow. *Forewing* with a broad intense black outer marginal band, traversed by four subapical white spots—the upper one being slender and less distinct; the band curves angularly outward from within upper end of the cell to the middle median veinlet, below which it is deeply excavated to the lower median, and then terminates broadly outward to the posterior angle; base of wing and costal base dark grey scaled. *Hindwing* with a moderately broad black outer marginal sinuous-edged band, the anal area and base of wing being irrorated with dark grey scales. Underside. *Forewing* with a broad black normal-shaped subapical band, its inner-edge as on the upperside; the discal area greyish-white, the base and costal edge pale yellow tinted, the apex bright ochreous-yellow. *Hindwing* bright ochreous-yellow, traversed by a somewhat zigzag blackish-scaled broken submarginal fascia.

Expanse, ♂  $2\frac{4}{10}$  to  $2\frac{8}{10}$  inches.

*Dry-season Brood* (Plate 554, fig. 1d, e ♂, 1f, g ♀).

Male. Upperside. *Forewing* with a narrower outer-marginal band than in the wet form, the cluster of scales between the upper and middle medians absent. *Hindwing* with less apparent marginal tip to the veins. Underside with the apex of *forewing*, and the entire *hindwing* of a much paler yellow.

Female. Upperside similar to the wet form. Underside. *Forewing* with similar black band, the apex being pale bluish-grey. *Hindwing* very faintly tinted with glossy pale yellow, and the outer margin with pale glossy bluish-grey, and—in some specimens—portions of the submarginal clusters of scales are very slightly apparent.

Expanse, ♂  $2\frac{4}{10}$ , ♀  $2\frac{4}{10}$  to  $2\frac{6}{10}$  inches.

HABITAT.—Ceylon.

DISTRIBUTION.—Cramer gives “Coromandel and Java” for his types of *Paulina*; his figures, however, agree only with the dry-season form of our present species, consequently his localities are erroneous. This species is confined to Ceylon. Mr. L. de Nicéville writes that “it is found all over the Island, but is more common at the commencement of the monsoons than at any other times, when it migrates in immense swarms. Strangely enough it has never been bred” (J. As. Soc. Bengal, 1899, 217). Capt. Wade obtained it in the “Western and Central Provinces, both

in the Plains and up to 6,000 feet, in open ground and forest, being much more common in the Hills than in the Plains. It has a very rapid and long flight." Mr. F. M. Mackwood found it "most abundant in low country and up to 4,000 feet. It is found all the year round. In the up-country flights, this species forms a third or half of the whole number; on a sunshiny day thousands will pass by in an hour. When the flight is over, they are to be found congregated on damp spots in the open sunshine in great numbers. I have seen quite 100 within the diameter of twelve inches" (Lep. Ceylon, i. 133). Mr. T. A. Mann (referring to this species as *Galene*) writes: "I observed this butterfly migrating in thousands across the northern part of the Island during March and April, 1859, in a direction from N.E. to S.W. The movement commenced about 7 a.m., and lasted until noon, when it decreased, and was renewed in the afternoon for another two hours" (Proc. Linn. Soc. London, June, 1895).

#### CATOPHAGA GALENE.

Plate 555.

*Pieris Galene*, Felder, Reise Novara Lep. ii. p. 165, ♂ (1865).

*Tachyris Paulina* (pt.), Wallace, Trans. Ent. Soc. 1867, p. 369.

*Catophaga Neombo*, Moore, Lep. of Ceylon, i. p. 131, pl. 50, fig. 3, a, b ♀ (nec fig. 3).\*

*Catophaga Venusta*, Moore, Lep. Ceylon, i. p. 132, pl. 51, fig. 3 ♀ (1881). *Dry form.*

*Calophaga albina* (pt.), Butler, Ann. Nat. Hist. 1898, p. 397.

*Appias albina*, de Nicéville, Journ. As. Soc. Bengal, 1899, p. 217, *neo* Boisd.†

Plate 555, fig. 1, 1a, b ♂, 1c, d, h, i ♀.

Male. Upperside greyish-white. *Forewing* with the base of costal border and basal area very slightly grey-scaled, the apical border very slenderly sinuously-edged with dusky-grey scales, or these scales are absent (as in fig. 1b). *Hindwing* unmarked, or the upper veinlets marginally ended with a few dusky grey scales. Underside. *Forewing* with the apical area, and the entire hindwing, washed with very pale ochreous-yellow.

Female. *Trimorphic*. Form I. (*wet season*, fig. 1c, d, h, i.) Upperside with the ground-colour of both wings yellow, that of the forewing being of a more or less pale lemon-yellow tint, and the hindwing of an ochraceous tint. *Forewing* with the basal area and base of costa broadly dusky-grey scaled; a broad black outer band extending from middle of the costa and decreasing hindward to the posterior angle, its inner upper edge being outwardly-oblique and angled beyond the upper end of the cell and again at upper median veinlet, below which it is excavated to the

\* This fig. 3 was taken from a South Indian specimen in our Collection, which we then mistook to be the male of this species, but have now proved it to be the *extreme-dry* form of *C. Wardii*, and as such we have described it and refigured it on our Plate 552 (fig. 1f, g).

† The true *albina* of Boisduval (Spéc. Gen. p. 480) is an allied species from Amboina.

lower median, and thence decreases outwardly to the posterior angle; the band is traversed by four yellow subapical spots and sometimes an upper fifth speckled spot is also apparent, the entire series vary in size, the larger series (fig. h) being more inwardly positioned. *Hindwing* with a black outer marginal dentated continuous or macular band, and in some specimens with the continuous band there are submarginal clusters of minute black scales. Underside. *Forewing* with the discal area pale lemon-yellow as on upperside, the basal and apical area deep ochreous-yellow; the subapical normal-shaped black band narrow, either prominent or ill-defined. *Hindwing* uniformly deep ochreous-yellow.

Expanse, ♂  $2\frac{4}{10}$ , ♀  $2\frac{9}{10}$  to  $2\frac{4}{10}$  inches.

Form II. (Plate 555, fig. 1e, f, g), *dry-season*. Upperside. Both wings with the ground-colour greyish-white, the hindwing with very faint traces of pale yellow along extreme outer margin. *Forewing* with the black outer band similar, the subapical spots being white and comparatively more medially positioned. *Hindwing* with the black marginal band more macular and in some specimens decreasingly smaller. Underside white, the hindwing being very faintly glossy yellowish-tinged and with a pale greyish outer marginal border. *Forewing* with the base faintly pale yellow tinged, the apex pale grey, the black subapical band more curved on its outer edge.

Expanse,  $2\frac{9}{10}$  inches.

Form III. (Plate 555, fig. 1j, k ♀), *extreme dry season*. Upperside. Both wings with the ground-colour greyish-white, their black markings, and apical white spots on the forewing, disposed as in the yellow form, fig. 1h. Underside greyish-white, the *hindwing* glossy and very faintly tinged with pale yellow, and the outer border pale grey tinged. *Forewing* with the black band slender and ill-defined, the apex glossy pale grey and outwardly edged with pale yellow.

Expanse,  $2\frac{9}{10}$  to  $2\frac{4}{10}$  inches.

HABITAT.—Ceylon.

DISTRIBUTION.—Capt. Hutchison records it as being found in the Hills of the Central Provinces, from 3,000 to 6,000 feet elevation, in open places in forest, generally in company with the preceding species, the yellow variety being found with the white one, but less common. Mr. F. M. Mackwood obtained it “in the Hills from 2,500 and principally up to 4,000 feet. It is found in abundance in the early months of the year, taking part in the large annual flights of butterflies” (Lep. Ceylon, i. 131). Mr. L. de Nicéville writes, “It is particularly common in Ceylon, occurring wherever *Paulina* is found and at the same seasons” (J. A. S. Beng. 1899, 217).

Of our illustrations on Plate 555, fig. 1, 1a is from a *wet* season male; 1b, the male type of Felder's *Galene*—now in Mr. Walter Rothschild's Collection; fig. 1c, d, and h, i, yellow females of the *wet* form; fig. 1e, f, g, white females—*dry* season form, and fig. 1j, k, *extreme dry* female.

## CATOPHAGA SWINHOEI.

Plate 556, fig. 1, *larvæ* and *pupæ*, 1a, b, c ♂ ; 1d, e, f, g, h, i, j ♀.

*Appias Ares* (pt.), Swinhoe, Proc. Zool. Soc., 1885, p. 138 ♂ ; Moore, Lep. Indica, vi. p. 205, pl. 542, fig. 3 ♂ (1905).

*Catophaea Paulina*, Taylor, Batt. of Orissa, p. 15 (1888).

*Catophaea Neombo*, Hampson, Journ. As. Soc. Bengal, 1888, p. 362.

*Catophaea Lankapura*, Watson, Journ. As. Soc. Bengal, 1890, p. 268.

*Appias Neombo*, Davidson and Aitken, Journ. Bombay N. H. Soc. 1896, p. 574 ; de Nicéville, Journ. As. Soc. Bengal, 1900, p. 254.

Both sexes smaller than *C. Darada*. Male (fig. 1a, b, c). Upperside. *Forewing* greyish-white, apical marginal band narrower and less defined. *Hindwing* unmarked. Underside with the apex of *forewing*, and the entire *hindwing* very faintly tinted with pale yellow.

Female. Dimorphic. *Form I.* (fig. 1d, e, f). Upperside greyish-white. *Forewing* with the black outer band somewhat narrower than in *Darada*, the subapical white spots similarly disposed. *Hindwing* with the marginal black dentated band also comparatively narrower and continuous, or sometimes macular. Underside. *Forewing* with greyish-white discal area, the basal area, costal and outer marginal edge pale yellow, the normal-shaped black subapical band narrow, and the apical area glossy pale grey. *Hindwing* glossy greyish-white, the basal and costal area and the outer edge slightly tinted with pale yellow.

Expanse, ♂  $2\frac{3}{10}$  to  $2\frac{4}{10}$ , ♀  $2\frac{3}{10}$  to  $2\frac{6}{10}$  inches.

*Form II.* (fig. 1g, h). Smaller than in *form I.* Upperside. *Forewing* with the outer band narrower, the subapical white spots less medially positioned. *Hindwing* with the marginal band composed of smaller dentate spots. Underside similar to *form I.*

Expanse,  $2\frac{2}{10}$  inches.

*Form III.* (fig. 1i, j). Upperside similar to *form II.* Underside. *Forewing* with the apical area, and the entire *hindwing* ochreous-yellow.

Expanse,  $2\frac{4}{10}$  inches.

**LARVA.**—Slender; dorsally and sublaterally clothed with fine short hairs; head slightly hairy; a pale green dorsal, a pale yellow lateral, and a brown sublateral stripe extending from head to anal segment; head and legs brown.

**PUPA.**—Head with a frontal point; thorax dorsally produced and angled; basal segments of abdomen broad and laterally angled. Colour pale green; wing cases and a lateral oblique abdominal stripe pale yellow. (Described from Sir W. Elliot's drawing).

**HABITAT.**—Southern India.

**DISTRIBUTION.**—Col. C. Swinhoe has males from Ahmedabad, and Bisnuggur in

Guzerat, taken in December, and from Poona, taken in November, January, and February, also male from N. Kanara, taken by Mr. Davidson, and a male from Orissa (*ex Coll. de Nicéville*). We possess a male from Poona taken in January by Col. Swinhoe, both sexes from N. Kanara, taken by the late Mr. S. N. Ward, also both sexes from the Nilgiris (*ex. Coll. Hampson*), and from Travancore. Capt. E. Y. Watson records it (as *Lankapura*) from "Madras, taken in July and August" (*l.c.* p. 268). The larva of this butterfly was found by the late Sir W. Elliot at Elamane, Madras, on November 25th, changing to pupa December 8th, and the imago emerging December 17th, a coloured drawing being made of both larvæ, pupæ, and imago, the latter agreeing exactly with our male (fig. 1a, b).

Of our illustrations on Plate 556, fig. 1, *larvæ* and *pupæ*, are copied from and in the same positions as in Sir W. Elliot's original drawing; fig. 1a, b, from a male taken at Poona in February, by Col. Swinhoe; fig. 1c, from a S. Indian male; 1d, e, from a Malabar female; 1f, from a S. Indian female; 1g, h, from a Travancore female; and 1i, j, from a female taken above the west Ghâts by Mr. S. N. Ward.

#### CATOPHAGA DARADA.

##### Plate 557.

*Pieris Darada*, Felder, Reise Novara Lep. ii. p. 166, ♂ (1865).

*Catophaga Darada*, de Nicéville, Journ. As. Soc. Beng. 1885, p. 50. Swinhoe, Trans. Ent. Soc. 1893, p. 310.

*Tachyris Paulina* (var.), Wallace, Trans. Ent. Soc. 1867, p. 370.

*Catophaga Paulina et Neombo*, Moore, P. Z. S. 1878, p. 838.

*Tachyris Paulina*, Elwes, Trans. Ent. Soc. 1888, p. 418.

*Catophaga Paulina*, Rothney, Ent. Mo. Mag. 1882, p. 35. de Nicéville, Journ. As. Soc. Bengal, 1886, p. 371; *id.* Sikkim Gazetteer, 1894, p. 169. Watson, Journ. Bombay N. H. Soc. 1891, p. 53.

*Appias Paulina*, Adamson, List Burmese Butt. p. 44 (1897). Watson, Journ. Bombay N. H. Soc. 1897, p. 670.

*Wet-season form* (Plate 557, fig. 1, 1a ♂, 1b, c ♀).

Male. Upperside greyish-white. *Forewing* with the costal border blackish-grey speckled; an outer marginal black-scaled band decreasing hindward to beneath the lower median veinlet, its inner-edge being distinctly sinuous; basal area tinged with pale grey. *Hindwing* with an outer marginal series of five black-scaled small dentated spots. Underside. *Forewing* greyish-white, the basal area faintly tinged with pale yellow, the apex very pale ochreous-yellow. *Hindwing* uniformly very pale ochreous-yellow.

Female. Upperside greyish-white; the hindwing extremely faintly tinged with pale yellow. *Forewing* with the basal area and costal base broadly blackish-grey scaled; a broad black outer marginal band extending from before middle of the costa to posterior margin, the band being angled outward beyond lower end of cell and

excavated between the middle and lower median, and traversed by a subapical series of decreasing white spots, usually four, and sometimes an upper fifth is slenderly apparent. *Hindwing* with the basal area dusky-grey scaled; a moderately broad black outer-marginal dentated band, which, in some specimens, has a few blackish scales scattered between the posterior portions. Underside. *Forewing* basally tinged with pale yellow, the apex clear ochreous-yellow, the normal-shaped black subapical transverse band narrow. *Hindwing* uniformly clear ochreous-yellow.

Expanse, ♂  $2\frac{4}{10}$  to 3, ♀  $2\frac{6}{10}$  to  $2\frac{8}{10}$  inches.

*Dry-season form* (Plate 557, fig. 1d ♂, e, f ♀).

Male. Upperside. *Forewing* with the outer band comparatively narrower than in *wet* form. *Hindwing* with the marginal spots small and slender. Underside similar, the apex of forewing, and the hindwing paler.

Female. Upperside similar to *wet* female, both wings being uniformly greyish-white. Underside. *Forewing* with the black subapical band slightly broader, the apex being glossy pale grey. *Hindwing* glossy pale grey.

Expanse, ♂  $2\frac{4}{10}$  to  $2\frac{8}{10}$ , ♀  $2\frac{6}{10}$  to  $2\frac{8}{10}$  inches.

*Extreme dry form* (Plate 557, fig. 1g ♂, h, i ♀).

Male. Upperside. *Forewing* comparatively more pointed at the apex, the apical margin with narrower and less-defined, or obsolescent, blackish-scaled border. *Hindwing* unmarked. Underside similar to the ordinary *dry* form, the apex, and the hindwing being somewhat brighter pale yellow tinted.

Female. Upperside greyish-white. *Forewing* with the black outer band somewhat narrower than in the ordinary *dry* form, the white subapical spots less medially disposed. *Hindwing* with the black marginal band macular and narrower.

Expanse, ♂  $2\frac{4}{10}$  to  $2\frac{6}{10}$ , ♀  $2\frac{4}{10}$  inches.

**HABITAT.**—Lower Sikkim; Assam, Khasias, Silhet; Lower Bengal; Burma; Upper Tenasserim.

**DISTRIBUTION.**—We possess both sexes of the *wet-season* form from Darjiling and from Eastern Bengal; also female from Barrackpur, near Calcutta, taken by Mr. J. Rothney; males of the *wet* form from Lushai and Moulmein, Burma. Of the *dry-season* form, we have males from Silhet, and Parisnath Hill, Lower Bengal, taken in September by the late W. S. Atkinson, and from Upper Tenasserim, also females from Darjiling and Barrackpur; of the *extreme dry* form we have males from Moulmein. Col. C. Swinhoe has the male of the *wet* form from Palene, Burma, a female of the *dry* form from the Khasias, and Palene, and also *extreme dry* from Palene. In Mr. Walter Rothschild's Collection is a *wet* male from Dibrugarh, Assam. Mr. H. Grose-Smith has a female of the *dry* form from Malda, Bengal, and *extreme dry*

from Burma (*ex Coll. Hauxwell*). Mr. H. J. Elewes writes, "Möller notes it as rare in Sikkim, in April and May, at the lowest elevations" (Tr. Ent. Soc. 1888, 418). The type specimen is recorded by Dr. Felder, from Silhet. Col. C. Swinhoe has received specimens from the "Khasia Hills" (*l.c.* 1893, 310). Mr. J. Wood-Mason obtained "seven males in forests in and around Silcuri, Cachar, from May 20th to July 11th, a male on Nemotha Peak, 3,634 feet elevation, October 2nd; also twelve females from May 20th to July 11th, and three females with the apex of forewing and entire hindwing on underside rich ochreous, in June and July, around Silcuri" (J. As. Soc. Beng. 1887, 371). Mr. J. Rothney caught it in "Barrackpur Park, near Calcutta" (Ent. Mo. Mag. 1882, 35). Mr. L. de Nicéville took "a single male in the neighbourhood of Calcutta, in August" (J. As. Soc. Beng. 1885, 50). Capt. E. Y. Watson records "a single female taken at Loungat, in May, during the Chin-Lushai Expedition of 1889-90" (J. Bombay N. H. Soc. 1891, 53), also "a single specimen in the Upper Chindwin District in May, and numerous specimens in the Hills, from 3,500 feet, during the rains" (*l.c.* 1897, 670). Col. C. H. E. Adamson obtained "numerous males, and one female, in November, in the Arakan Hills and in Tenasserim" (List Burn. Butt. 44). Dr. N. Manders probably refers to this species [as *T. Paulina*] being "rare at Fort Stedman, Shan States, but common in the Mone Valley, in April" (Tr. Ent. Soc. 1890, 534).

Of our illustrations on Plate 557, fig. 1, 1a, are from a *wet-season* male from Lushai, and 1b, c, a female from Darjiling; fig. 1d, from Felder's male *type*, in Mr. W. Rothschild's Collection; 1e, f, a *dry-season* female from Barrackpur; fig. 1g, a male of *extra-wet* form from Moulmein, and h, i, a female from Palene, Burma.

INDO-MALAY SPECIES.—*Catophaga Leis*, Hübner, Zutr. Exot. Schmett., fig. 771-2 ♀ (1832). *Syn.* *Pieris Amasene*, Boisd. Spec. Gén. Lep. p. 335, ♂ (1836). *Pieris Alope*, Wallace, Trans. Ent. Soc. 1867, p. 372, ♂. *Habitat.* Java.

*Catophaga Distanti* (Appias Leis, Distant, Rhop. Malay. p. 313, pl. 25, fig. 7 ♂, 6, 10 ♀ (1885). *Catophaga Leis*, de Nicéville, Journ. As. Soc. Bengal, 1895, p. 502. *Habitat.* Malay Peninsula; Sumatra; Borneo.

*Catophaga Agave* (*Pieris Agave*, Felder, Wien. Ent. Monats. 1862, p. 286. *Appias Agave*, Semper, Stett. Ent. Zeit. 1875, p. 398; *id.* Reise Phil. Lep. ii. p. 247, pl. 40, fig. 9-11, ♂ ♀ (1891). *Habitat.* Philippines.

*Catophaga Maria* (*Appias Maria*, Semper, Stett. Ent. Zeit. 1875, p. 405, ♂ ♀; *id.* Reise Phil. Lep. ii. p. 247, pl. 39, fig. 1-4, ♂ ♀ (1891). Butler, Ann. Nat. Hist. 1898, p. 398. *Habitat.* Luzon, Philippines.

*Catophaga Mata* (*Tachyris Mata*, Kheil, Lep. Ins. Nias, p. 34, pl. 4, fig. 21, ♂ (1884). *Habitat.* Nias.

*Catophaga Semperi* (*Appias albina*, Semper, Stett. Ent. Zeit. 1875, p. 36, ♂; *id.* Reise Phil. p. 246, pl. 40, fig. 6, 7, 8, ♂ ♀ (1891). *Habitat.* Philippines.

*Catophaga Neombo* (Pieris Neombo, Boisd. Spec. Gén. Lep. i. p. 539, ♀, *white form* (1836). Moore, Catal. Lep. Mus. E. I. Company, i. p. 72, pl. 2a, fig. 3, ♀, *yellow form* (1857). Type in Coll. C. Oberthür. Compared June, 1905. Agrees precisely with *white* females from Sumatra and Borneo in our possession. A *yellow* female from Borneo is in the Hewitson cabinet. *Habitat.* Sumatra; Borneo; Java.

#### Genus SALETARA.

*Saletara*, Distant, Rhop. Malayana, pp. 287, 316 (1885). *Semper*, Reis. Phil. Lep. p. 249 (1891).

Butler, Ann. Nat. Hist. 1898, p. 400.

*Tachyris* (group A, pt.) Wallace, Tr. Ent. Soc. 1867, pp. 312, 363.

*Appias* (sect. *Catophaga*, pt.) Watson, Journ. Bombay N. H. Soc. 1894, p. 499.

*Catophaga* (group 3, *Saletara*), Butler, Ann. Nat. Hist. 1898, p. 399.

*Trigonia* (pt.), Geyer, Hübner's Zutr. v. pp. 21, 35 (1837); *preoccupied*.

Male. *Forewing* triangular, costa long and almost straight, apex acutely pointed, exterior margin very oblique; third subcostal veinlet, normally, with a short furcation (or fourth branch) at its apex, the latter being sometimes present on one wing only, or, occasionally, absent. *Hindwing* triangularly oval. Anal tufts long, the valves also hairy above; intromittent organ sometimes exserted.

TYPE.—S. Distanti [Nathalia].

#### SALETARA CHRYSÆA.

Plate 558, fig. 1, 1a ♂, 1b, e ♀.

*Saletara Panda*, subsp. *Chrysæa*, Fruhstorfer, Soc. Ent. 1903, p. 124; *id.* Stett. Ent. Zeit, 1904, p. 348.

Male. Upperside. *Forewing* white, the lower discal area very faintly tinted with pale ochreous-yellow, becoming slightly darker along the posterior angle; base of costal border and discal area greyish-black scaled, the apical costal-edge being black; outer margin with a narrow sinuated black band, which is attenuated posteriorly and ends beyond the lower median veinlet. *Hindwing* entirely ochreous-yellow, without any marginal markings. Underside. Both wings ochreous-yellow.

Female. Upperside ochreous-yellow. *Forewing* with the base broadly greyish-black scaled, the costal border from about the middle and the outer border broadly black. *Hindwing* with a broad black outer marginal sinuated band, the upper portion being macular; basal area and lower discal area slightly greyish-black scaled, the abdominal margin being white. Underside. *Forewing* pale yellow, the posterior border being white; a black band curving outward from the third subcostal to the posterior angle; the apical border, and outer margin narrowly, being pale yellow, and enclosing a series of subapical white spots. *Hindwing* white; the costal and outer border being very narrowly edged with pale yellow.

Expanse, ♂  $2\frac{1}{2}$ , ♀  $2\frac{1}{4}$  inches.

HABITAT.—Nicobar Islands.

Described from specimens in Col. C. T. Bingham's Collection, taken on Great Nicobar Island, March, 1904, by Mr. G. Rogers.

INDO-MALAYAN SPECIES.—*Saletara Distanti*, Butler, Ann. Nat. Hist. 1898, p. 400, ♂ ♀. Sal. Nathalia, Distant, Rhop. Malay. p. 317, pl. 26, fig. 1, 2, ♂ ♀ (1885). Snellen, Mid. Sumatra, p. 8, pl. 2, fig. 6-11 (1888). de Nicéville, Journ. As. Soc. Beng. 1895, p. 504. *Tachyris Nathalia*, Wallace, Tr. Ent. Soc. 1867, p. 369. *Habitat*. Malay Peninsula; Singapore; Sumatra; Borneo.

*Saletara Engania*, Fruhstorfer, Soc. Ent. 1903, p. 124; *id.* Berl. Ent. Zeit. 1904, p. 203; *id.* Stett. Ent. Zeit. 1904, p. 347. *P. Panda*, *var.* Snellen, Tijd. v. Ent. 1895, pl. 1, fig. 3, ♂. *Habitat*. Engano Island; Nias Island.

*Saletara Panda* (Pieris Panda, Godart, Encyc. Méth. ix. p. 147, ♂ (1819). Boisd. Spec. Gén. Lep. p. 485 (1836); Moore, Catal. Lep. Mus. E. I. Company, i. p. 71 (1857). *Trigonia Panda*, Geyer, Hübner's Zutr. v. p. 35, fig. 943-4, ♂ (1837). *Tachyris Panda*, Wallace, Tr. Ent. Soc. 1867, p. 368. *Saletara Panda*, Butler, Ann. N. H. 1898, p. 400. *Syn.* *Pieris sulphurea*, Vollenhoven, Monog. Pier. p. 32, pl. 4, fig. 4, ♀ (1865). *Habitat*. Java.

*Saletara Nathalia* (Pieris Nathalia, Felder, Wien. Ent. Monat. 1862, p. 285), Semper, Reis. Phil. Lep. p. 249, pl. 40, fig. 12, 13, ♀ (1891). Butler, Ann. Nat. Hist. 1898, p. 400. *Syn.* *Tachyris Panthea*, Wallace, Tr. Ent. Soc. 1867, p. 376, ♀. *Habitat*. Philippines.

#### Genus TACHYRIS.

*Tachyris* (sect. C, pt.), Wallace, Trans. Ent. Soc. 1867, pp. 312, 316.

*Tachyris*, Scudder, Proc. Amer. Acad. A. Sc. 1875, p. 274.

*Trigonia*, Geyer, Hübner's Zutr. v. p. 21 (1837), preoccupied.

Male. *Forewing* triangular; costa arched from the base, apex obtuse; third subcostal furcated at one-fifth from the apex. *Hindwing* triangularly-oval, exterior margin very convex. Anal tufts long.

TYPE.—*T. Nero*.

HABITS.—Mr. H. O. Forbes (Wanderings Eastern Archipelago, p. 227) writes: "This species, as observed in Sumatra, is found in the open paths and sunny roads, often flying in flocks of over a score, exactly matching in colour the fallen leaves, which it was amusing to observe how often they mistook for one of their fellows at rest, and to watch the futile attentions of an amorous male towards such a leaf moving slightly in the wind." Dr. L. Martin says "males are not rare in N.E. Sumatra, in large forest, and frequent wet spots on roads. Females are very rare. It is found throughout the year, and over the whole of our area, except in the higher

elevations; it even occurs near the sea. Its flight is very rapid if pursued." (J. As. Soc. Bengal, 1905, 501).

### TACHYRIS GALBA.

Plate 558, fig. 2, 2a ♂ (*Wet form*), 2c, d ♂ (*Dry form*).

*Tachyris Galba*, Wallace, Trans. Ent. Soc. 1867, p. 378, ♂.

*Appias Galba*, Butler, Ann. Nat. Hist. 1883, p. 339.

*Catophaea Galba*, Watson, Journ. Bombay N. H. Soc. 1894, p. 499.

*Tachyris Nero*, Wood-Mason and de Nicéville, Journ. As. Soc. Bengal, 1886, p. 372. Elwes, Tr. Ent. Soc. 1888, p. 418. de Nicéville, Sikkim Gazetteer, 1894, p. 169. Swinhoe, Tr. Ent. Soc. 1893, p. 310. Fruhstorfer, Iris, 1902, p. 293; *id.* Soc. Ent. 1903, p. 41.

*Appias Nebo*, Grose-Smith, Rhop. Exot., App. pl. 1, fig. 1, 2 ♂ (1894)—(*Dry form*). Adamson, List Burm. Butt. p. 43 (1897).

*Wet-season Brood* (Plate 558, fig. 2, 2a ♂).

Male. *Forewing* more acute at the apex than in typical *Nero*. Upperside. Ground-colour of both wings dark crimson (varying in some specimens to a much paler ochreous-red tint); all the veins distinctly black lined. *Forewing* with base of costa and basal area slightly speckled with yellowish and black scales; a blackish-scaled outer marginal sinuous border decreasing posteriorly from the apex to submedian, preceded by a discal transverse excurved series of black-scaled angled vein-spots, which extend from the third subcostal branch to lower median veinlet, these spots being very slightly joined along the vein borders to the opposite angle of the outer band. *Hindwing* with the abdominal area yellowish-ochreous, the veins basally slightly and exteriorly distinctly black lined, and merging into an outer marginal black-scaled somewhat macular band, this band in the paler red specimens being quite macular. Underside. *Forewing* much paler, the costal border and apex yellowish-ochreous, the outer band and discal markings of the upperside being slightly apparent. *Hindwing* yellowish-ochreous, very sparsely and indistinctly irrorated with minute dusky scales, except on the outer discal area, where their absence forms a slightly paler submarginal fascia. Female not examined.

Expanse, ♂  $2\frac{3}{4}$  to  $2\frac{1}{4}$  inches.

*Intermediate form*. Male. Upperside. Both wings uniformly pale crimson. *Forewing* with all the veins black-lined throughout, the marginal and discal markings being entirely absent. *Hindwing* with the outer veins externally black-lined; no marginal markings. Underside. *Forewing* reddish-ochreous, the apex palest. *Hindwing* uniformly deep ochreous-yellow. Khasia Hills.

Expanse,  $2\frac{3}{4}$  inches.

*Dry-season Brood* (Plate 558, fig. 2c, d ♂).

Male. Upperside. *Forewing* either paler crimson than in *wet* form or ochreous-

red; outer margin and end of the veins for some distance inward black scaled. *Hindwing* either paler crimson or paler ochreous-red, than on the forewing, basally, merging to pale reddish-ochreous externally to extreme outer margin, the upper veins sometimes with a few blackish scales at their tip. Underside. *Forewing* pale reddish-ochreous or ochreous-yellow basally, merging to pale yellowish-ochreous externally. *Hindwing* pale reddish-ochreous basally, merging to pale ochreous-yellow externally, or uniformly pale ochreous-yellow.

Expanse, ♂  $2\frac{3}{4}$  to  $3\frac{1}{4}$  inches.

HABITAT.—Lower Sikkim; Assam; Cachar, Khasias; Manipur; Upper Burma; Shan States; Siam; Tonkin.

DISTRIBUTION.—Mr. H. J. Elwes records it as “of very rare occurrence in Sikkim, where,” he says, “I have never seen it. Mr. O. Möller has one or two specimens from the low outer Hills” (Tr. Ent. Soc. 1888, 418). The type specimen of *Galba* was taken by Major J. Lind Sherwill, probably, in Assam. In Mr. W. S. Atkinson’s Collection were specimens from “Dansuri, Assam.” Col. C. Swinhoe records “many examples from the Khasia Hills” (Tr. Ent. Soc. 1893, 310). Mr. J. Wood-Mason obtained “a single female at Irangmara, Cachar, in July” (J. As. Soc. Beng. 1886, 72). Dr. G. Watt caught “several specimens near Manipur” (Ann. N. H. 1885, 339). Col. C. H. E. Adamson obtained the type specimen of *Nebo* “in the Hills of the extreme north of the Chindwin District, Upper Burma, in the cold weather” (List, p. 43). “In Mr. L. de Nicéville’s Collection are both sexes of *Nebo*, from Upper Burma, which were taken in the same locality as the type, in April, and is, I believe, only a spring dry form” (J. As. Soc. Beng. 1895, 501). It is also recorded from the Shan States; Siam, and Tonkin.

Of our illustrations on Plate 558, fig. 2, 2a, are from the male type of *Galba*, in our own Collection; fig. 2b, is from a Malayan male of *Figulina*, and fig. 2c, d, from the type of *Nebo*, in the possession of Col. Adamson, at Newcastle.

INDO-MALAY SPECIES.—*Tachyris Nero* (Pap. Nero, Fabricius, Ent. Syst. iii. i. p. 153, ♂ (1793). Donovan, Ins. Ind. pl. 32, fig. 1 (1800). *Pieris Nero*, Boisduval, Spec. Gén. Lep. p. 485 (1836). Doubleday, Gen. D. Lep. i. p. 51 (1847). Moore, Catal. Lep. Mus. E. I. C. i. p. 70 (1857). *Trigonia Nero*, Geyer, Hübner’s Zutr. v. p. 21, fig. 881-2, ♂ (1837). *Tachyris Nero*, Wallace, Tr. Ent. Soc. 1867, p. 378. Butler, Catal. Fabr. Lep. B. M. p. 209 (1869). *Pieris Thyria*, Godt. Enc. Méth. ix. p. 147 (1819). Griffith, Cuv. Ins. pl. 21, fig. 1, ♂; Guérin, id. pl. 77, fig. 1. Lucas, Lep. Exot. pl. 25, fig. 3 (1835). *Pontia Thyria*, Horsfield, Zool. Journ. v. p. 69, pl. 4, fig. 2, ♂ (1829). *Habitat.* Java.

*Tachyris Figulina* (*Pieris Figulina*, Butler, Ann. Nat. Hist. 1867, p. 399, pl. 8, fig. 1, ♀. *Appias Figulina*, Butler, Tr. Linn. Soc. Zool. 1879, p. 551. *Tachyris Nero* (pt.), Wallace, l.c. p. 378 (1867). *Appias Nero*, Distant, Rhop. Malay. p. 311,

pl. 24, fig. 9, 10, ♂ ♀ (1885). Doherty, J. As. Soc. Beng. 1889, p. 121. de Nicéville, J. As. Soc. Beng. 1895, p. 500. T. Perakana, Fruhstorfer, Iris, 1902, p. 178. *Habitat.* Malay Peninsula; Sumatra; Borneo.

*Tachyris Ramosa* (Catoph. Ramosa, Fruhstorfer, Berl. Ent. Zeit, 1898, p. 328; *id.* Deuts. Ent. Zeit. 1902, p. 293. *Habitat.* Nias Island.

*Tachyris Flavius* (Appias Flavius, Grose-Smith, Ann. Nat. Hist. 1892, p. 427, ♂ ♀. *Habitat.* Taganac Island, N.E. Borneo.

*Tachyris Hainanensis* (Tach. Hainanensis, Fruhstorfer, Iris, 1902, p. 178. *Habitat.* Hainan Island, Wien.

*Tachyris Domitia* (Pieris Domitia, Felder, Ent. Monats. vi. p. 285, ♂ (1862). *Tachyris Domitia*, Wallace, Tr. Ent. Soc. 1867, p. 379. *Appias Domitia*, Semper, Reis. Phil. Lep. p. 244, pl. 40, fig. 1-5, ♂ ♀ (1891). *P. Asterope*, Felder, l.c. p. 286, ♀. *Pieris Zamboanga*, Feld. l.c. p. 285, ♀. *Appias Mindanaensis*, Butler, Ann. Nat. Hist. 1883, p. 421. *Habitat.* Philippines.

#### Genus LEPTOSIA.

*Leptosia*, Hübner, Verz. bek Schmett. p. 95 (1816). Scudder, Proc. Amer. Acad. A. et S. Boston, 1875, p. 204. Distant, Rhop. Malay, p. 287 (1885). Kirby, Allen's Nat. Libr. Butt. ii. p. 176 (1896). *Pontia* (sub-gen.) *Nina*, Horsfield, Catal. Lep. Mus. E. I. Company, p. 140 (1829).

*Pontia*, Boisduval, Spec. Gén. Lep. i. p. 430 (1836). Doubleday, Gen. D. Lep. i. p. 40 (1847). Kirby, Syn. Catal. D. Lep. i. p. 439 (1871). Crotch, Cist. Ent. i. p. 66 (1872). Schatz, Exot. Schmett. ii. p. 65 (1886).

*Nychitona*, Butler, Cistula Entom. i. pp. 34, 41 (1870). Moore, Lep. of Ceylon, i. p. 117 (1881).

**IMAGO.**—Wings very delicate. *Forewing* subpyriform, apical margin very convex; costal vein extending two-thirds the margin; subcostal branches far apart, first branch at one-third before end of the cell, second immediately before the end, third and fourth (or upper radial) on a foot-stalk one-third beyond the cell; lower radial from upper end of the cell; discocellular veinlet deeply concave; cell more than half length of the wing; middle median at one-eighth and lower at nearly one-half before end of the cell; submedian vein recurved. *Hindwing* triangularly-oval, exterior margin very convex; precostal vein short; costal vein arched at the base; first subcostal branch much curved, emitted at one-third before end of the cell; upper discocellular bent outward near the subcostal, lower outwardly oblique, radial from angle of upper near subcostal; middle median at one-fourth and lower at one-half before end of the cell; submedian vein straight, internal recurved. *Body* very slender; palpi pilose beneath, projecting beyond the head; antennæ with a long compressed pointed club.

**LARVA AND PUPA.**—“Very like those of *Terias Hecabe*, but more delicately formed.

Larva green, with a pale glaucous tinge about the bases of the legs, and slightly hairy. Pupa sometimes green, but oftener of a delicate pink shade" (Davidson and Aitken, J. Bombay N. H. S. 1896, 569).

TYPE.—*L. Xiphia*.

### LEPTOSIA XIPHIA.

Plate 559, fig. 1 ♂, 1a, b ♀.

*Papilio Xiphia*, Fabricius, Spec. Ins. ii. p. 43 (1781); Mant. Ins. p. 20 (1787).

*Pontia Xiphia*, Butler, Catal. Fabr. D. Lep. Brit. Mus. p. 229 (1869). Kirby, Syn. Catal. D. Lep. p. 439 (1871). Druce, Proc. Zool. Soc. 1873, p. 354; id. 1874, p. 107. Swinhoe, P.Z.S. 1885, p. 135; id. Tr. Ent. Soc. 1893, p. 309. Elwes, Tr. Ent. Soc. 1888; p. 407.

*Leptosia Xiphia*, Distant, Rhop. Malay. p. 288, pl. 26, fig. 8 (1885). de Nicéville, Journ. As. Soc. Bengal, 1885, p. 49; id. l.c. 1895, p. 486, 1899, p. 210; id. Sikkim Gaz. 1894, p. 165. Hampson, J. As. Soc. Beng. 1888, p. 361. Watson, J. Bombay N. H. Soc. 1888, p. 25; id. l.c. 1891, p. 51; 1895, p. 669; id. J. As. Soc. Beng. 1890, p. 267. Semper, Reis. Phil. Lep. p. 251, pl. 42, fig. 1, 2 (1891). Ferguson, J. Bombay, N. H. S. 1891, p. 413. Kirby, Allen's Nat. Libr. Butt. ii. p. 176 (1896). Mackinnon and de Nicéville, J. Bombay N. H. S. 1898, p. 535. Adamson, List Burm. Butt. p. 40 (1897). Fruhstorfer, Deuts. Ent. Zeit. 1902, p. 269.

*Nychitona Xiphia*, Butler, Cist. Ent. i. p. 41 (1870). Moore, P.Z.S. 1878, p. 837; id. Lep. of Ceylon, i. p. 118, pl. 46, fig. 6a (1881); Journ. Linn. Soc. Zool. 1886, p. 45. Taylor, List Orissa Butt. p. 13 (1888). Davidson and Aitken, Journ. Bombay N. H. Soc. 1896, p. 569.

*Papilio Nina*, Fabricius, Ent. Syst. iii. i. p. 194 (1793).

*Pontia Nina*, Horsfield, Catal. Lep. Mus. E. I. Company, p. 140 (1829). Boisduval, Spec. Gén. Lep. p. 430 (1836). Doubleday, Gen. D. Lep. i. p. 40 (1847). Moore, Catal. Lep. Mus. E. I. Company, i. p. 69 (1857). Wallace, Tr. Ent. Soc. 1867, p. 317. Lang, Ent. Mo. Mag. 1864, p. 102; Chaumette, id. l.c. 1865, p. 36; Rothney, id. l.c. 1882, p. 35. Snellen, Mid. Sumatra, p. 22 (1880). Staudinger and Schatz. Exot. Schmett. ii. p. 65 (1886).

*Pieris Nina*, Godart, Encycl. Méth. ix. p. 162 (1819).

*Leptosia chlorographa*, Hübner, Zuträge, fig. 47, 48 (1818).

Male. Upperside pure white. *Forewing* with the base of costal border marked with slender black outwardly-oblique striae; a black apical marginal band which is broad anteriorly and angled at the radial veinlet, and from thence to the middle median narrow and macular; in the discal interspace of upper and middle median is a large black outwardly-oblique quadrate spot, which more or less slightly extends over each veinlet, and sometimes a few scales from its lower outer end reach the opposite marginal spot. *Hindwing* either unmarked, or (probably wet brood) with an outer marginal black fine slender broken line. Underside white. *Forewing* with the costal border and apex more or less faintly tinted with olivescent-yellow and flecked with delicate dusky-grey short strigæ, the extreme outer margin being slenderly black scaled between the veins. *Hindwing* crossed by very slender dusky-grey irregular strigæ, those across the upper and lower discal area being more regular and form

ill-defined fasciæ, the extreme outer marginal edge slightly black scaled between the veins. *Body*, legs, and palpi white; antennæ black above, white beneath.

Female. Upperside pure white. *Forewing* with the costal base as in male, the black apical border and oblique discal spot slightly broader. *Hindwing* as in male, the extreme outer marginal line being also inwardly edged with blackish scales. Underside similar to the male.

Expanse, ♂  $1\frac{2}{10}$  to  $2\frac{6}{10}$ , ♀  $1\frac{6}{10}$  to  $1\frac{8}{10}$  inches.

HABITAT—Upper and Lower India; Ceylon; Burma; Tenasserim; Malay Peninsula; Sumatra; Borneo; Java; Philippines; Formosa.

DISTRIBUTION, HABITS, LARVA, ETC. (within our area).—In the North-west it was found, by Mr. P. W. Mackinnon, “in the Dehra Dun, elevation about 2,000 feet, S. of Masuri, commonly almost throughout the year” (J. Bombay N. H. Soc. 1898, 538). Capt. A. M. Lang writes: “I have seen this insect but in one place, a forest in the interior of Oudh, in the month of October. Under the bushes which formed the low underwood on the skirts of the forest, this delicate-winged insect flapped with weak flight, seeming to shun publicity, and to be afraid to fly boldly from the shelter of the bushes” (Ent. Mo. Mag. 1864, 102). North-eastward, it is recorded by Mr. H. J. Elwes, as “not common in Sikkim, but I have taken it below Mongpo in June, and it occurs up to 4,000 or 5,000 feet, from April to October” (Tr. Ent. Soc. 1888, 407). Col. C. Swinhoe notes it as being “common in the Khasia Hills” (*id. l.c.* 1893, 309). Capt. Chaumette writes, “Found in great abundance in Calcutta, flying very softly about, as if blown by the wind, in March and April” (Ent. Mo. Mag. 1865, 36). Mr. J. Rothney also obtained it in the “neighbourhood of Calcutta, in shady lanes from May to September. Never seen in the sun. Has a slow weak flight, and fond of ditches” (Ent. Mo. Mag. 1882, 35). Mr. L. de Nicéville records it as being “met with in the neighbourhood of Calcutta almost throughout the year” (J. As. Soc. Bengal, 1885, 49). Mr. W. C. Taylor found it “common at Khorda in Orissa” (List, p. 18, 1888). Col. C. Swinhoe obtained it in “Bombay in October, November, and December, in Poona from October to June; and on the Matheran Hill” (P. Z. S. 1885, 135). Messrs. J. Davidson and E. H. Aitken write: “This butterfly is met with in all parts of the N. Kanara District of Bombay, flitting about among underwood in shady places. Like many of the Pierinæ it is absent, or almost so, from June to September. We have bred the larva on Capers (*Capparis Heyneana*, *horrida*, *sepiaria*, and *Cratæva religiosa*). Both the larva and pupa are very like those of *Terias Hecabe*, but more delicately formed. The larva is green, with a pale glaucous tinge about the bases of the legs, and slightly hairy. The pupa is sometimes green, but oftener of a delicate pink shade” (J. Bombay N. H. S. 1896, 569). Mr. G. F. Hampson obtained it in the “Nilgiris, at from 1,000 to 7,000 feet elevation” (J. As. Soc. Bengal, 1888, 361). Capt. E. Y. Watson obtained it in

"Madras, very common, from March to August" (J. As. Soc. Beng. 1890, 267), also in "Mysore in November" (J. Bombay N. H. S. 1890, 7). Mr. H. S. Ferguson found it "not common in Travancore, in the Hills at 1,000 to 4,000 feet" (*id. l.c.* 1891, 448).

In Ceylon, Mr. F. M. Mackwood records it as "a low country butterfly, with a slow flight, and seldom seen away from low brushwood, its favourite haunt." Capt. Wade found it "very common at Kandy, and easy to capture." Capt. Hutchison took it at Matale, and in Colombo from June to December; flight slow, scarcely rising above the ground" (Lep. Ceylon, i. 118). Dr. N. Manders found it "widely distributed over Ceylon, and not uncommon in low country jungles" (J. As. Soc. Beng. 1899, 210).

In Burma, Col. C. H. E. Adamson records it as "very common in shady places throughout the country" (List Burn. Butt. 1897, 40). Capt. E. Y. Watson took it at "Pauk in November, and at Tilin from November to May" (J. Bombay N. H. S. 1891, 51). Capt. Watson also found it "common in the Upper Chindwin District, in the dry season, between January and June" (*id. l.c.* 1897, 669). Dr. J. Anderson took it in Mergui, Tenasserim, in November, and on Elphinstone Island in March" (J. Linu. Soc. Zool. 1886, 45).

#### LEPTOSIA NICOBARICA.

*Nychitona Xiphia*, var. *Nicobarica*, Doherty, Journ. As. Soc. Bengal, 1886, p. 262.

Male. Upperside. *Forewing* with the apical marginal black band comparatively narrower than in Ceylon, Indian, or Burmese specimens of *Xiphia*, the discal oblique spot being much smaller, transversely narrower, and less prominent. Underside. *Forewing* with the costal and apical flecks and discal spot indistinctly defined. *Hindwing* with the strigæ much less numerous and indistinctly defined.

Expanse,  $1\frac{4}{10}$  to  $1\frac{6}{10}$  inches.

HABITAT.—Great and Little Nicobar Island.

#### Sub-family COLINÆ.

*Colianæ*, Swainson, Cabinet Cyclo. p. 87 (1840).

*Rhodoceride*, Dupouchel, Catal. Méth. Lep. Eur. p. 26 (1844). Jutt. Brit. Butt. pp. 86, 251 (1896).

*Rhodoceridi*, Stephens, Catal. Brit. Lep. B. M. p. 2 (1850). Scudder, Butt. U. S. ii. p. 1,040 (1889).

*Pieridi* (pt.), Stephens, List Brit. Lep. B. M. p. 3 (1850). Stainton, Manual Brit. Lep. p. 15 (1857).

*Dryadæ*, Schatz, Exot. Schmett. ii. p. 66 (1886).

*Callidryinæ*, Kirby, Allen's Nat. Libr. Butt. ii. p. 207 (1896).

*Anthocharinæ* (pt.), Kirby, *l.c.* p. 185.

*Eurymini* (pt.), Grote, Proc. Amer. Phil. Soc. 1900, p. 46.

*Frugacia et Fidelia* (pt.), Hübner, Verz. bek. Schmett. pp. 96, 98 (1816).

IMAGO.—*Forewing* with four subcostal branches, the second branch being trifid, the fourth (or upper radial) emitted from the subcostal beyond end of the cell, and the lower radial from the discocellulars; or, the third subcostal is bifid, the fourth, or upper radial being emitted beyond the cell; or, in others, both radials freely start from the discocellulars.

### Genus COLIAS.

*Colias* (sect. ii.), Fabricius, Illiger's Mag. vi. p. 284 (1807). Ochsenheimer, Schmett. Eur. iv. p. 31 (1816).

*Colias*, Latreille, Cons. Gén. p. 440 (1810). Crotch, Cist. Ent. i. p. 66 (1872). Scudder, Amer. Acad. A. et Sci. Boston, 1875, p. 146. Kirby, Allen's Nat. Libr. Butt. ii. p. 220 (1896).

*Gonepteryx*, Leach, Edinb. Encyc. ix. p. 128 (1815). Samouelle, Ent. U. Comp. p. 236 (1819). Jermyn, Butt. Coll. Vad. M. pp. 46, 66 (1824). Curtis, Brit. Ent. pl. 173 (1827). Stephens, Illust. Brit. Ent. Haust. i. p. 8 (1827). Children, Phil. Mag. 1829, p. 18. Rennie, Cons. Butt. p. 1 (1832). Doubleday, Gen. D. Lep. i. p. 69 (1847). Stainton, Man. Brit. Lep. i. p. 15 (1857). Butler, Cist. Ent. i. pp. 34, 45 (1870). Schatz, Exot. Schmett. ii. p. 68 (1886). Dixey, Proc. Ent. Soc. 1905, p. 37.

*Gonoptera*, Dalman, in Billb. Enum. Ins. p. 76 (1820).

*Goniatpteryx*, Westwood, Int. Ins. ii. Gen. Syn. p. 87 (1840).

*Gonioptera*, Wallengren, Rhop. Scand. p. 145 (1853).

*Rhodocera*, Duponchel, Pap. Fr. D. Suppl. p. 386 (1832). Godart and Dup. Lep. Eur. p. 27 (1844). Staudinger, Catal. Lep. Eur. p. 6 (1871).

*Rhodocera* (pt.), Boisduval and Leconte, Lep. Amer. Sept. p. 70 (1833). Boisd. Spec. Gén. Lep. p. 597 (1836).

*Anteos*, Hübner, Verz. bek. Schmett. p. 99 (1816).

*Earina*, Speyer, Isis, 1839, p. 98.

IMAGO.—Wings subtriangular, broad, rather short. Underside of *hindwings* with the subcostal median and submedian vein thickened and densely clothed with laxly raised modified scales. *Forewing* with the costa much arched at the base and end, the apex projected and acutely angulated, the exterior margin very slightly sinuated below the apex, posterior angle rounded, cell long and broad, extending to beyond half the wing; costal vein ending at half the margin; first subcostal branch emitted at fully one-third and second at one-sixth before end of the cell, fourth at one-third before lower end of the third, the fourth terminating before the apex, the fifth (or upper radial) at some distance from beyond the cell; discocellular bent deeply inward at its middle, the radial from its upper angle; median branches wide apart; submedian much curved from the base. *Hindwing* broad, base of costa broadly lobate, apex rounded, exterior margin very slightly sinuated hindward, its angle at end of the middle median more produced and broader; abdominal margin long; cell long and very broad at the end. *Body* stout; *thorax* and *head* very hairy; *palpi* short, laterally

compressed and densely hairy beneath ; antennæ rather short, stout, with a gradually thickened elongated blunt club.

**LARVA.**—Adult. Cylindrical, slightly tapering at each end, dorsally rounded, vertically somewhat flattened, the lateral ridge rather sharply edged ; the head and dorsal area finely set with minute black dots, each emitting a short pale bristle. Colour dull glaucous-green, with a sublateral greyish-white stripe; spiracles inconspicuous ; ventral surface paler green. Feeds on *Rhamnus catharticus* and *frangulus*.

**PUPA.**—Pointed at each end ; thorax dorsally humped anteriorly and the abdomen slightly keeled to the tip, shoulders angulated ; a lateral ridge thence to the tip ; wing-cases produced in front to a curved narrow ridge enclosing the tongue-case, projecting beyond the ventral line of the abdomen, the latter curving gently to the tip. Colour pale green ; lateral ridge yellowish, frontal point and the shoulder purplish-brown.

**Egg.**—Flask-shaped, cylindrical, set on end ; with twelve longitudinal ribs and parallel intermediate fine lines ; deposited singly on the rib of upper or underside of the leaf.

**BROODS.**—Stephens (*l.c.* p. 9) says *Rhamni* “is apparently double-brooded, the first brood appearing about June, and the second in the autumn, and of the latter many of both sexes remain throughout the winter, and make their appearance on the first sunny day in spring.”

**TYPE.**—C. *Rhamni*.

#### COLIAS NEPALENSIS.

Plate 559, fig. 2, 2a, b, c, d ♂, 2e, f, g ♀.

*Rhodocera Rhamni*, Kollar, Hügel's Kaschnir, iv. p. 410 (1844).

*Rhodocera Rhamni* (var.), Gray, Lep. Ins. of Nepal, p. 9, pl. 5. fig. 1, ♂ (1846). Doherty, Journ. As. Soc. Bengal, 1886, p. 136.

*Gonepteryx Nepaleensis*, Doubleday, Gen. D. Lep. i. p. 71 (1847). Moore, Catal. Lep. Mus. E. I. Com. any. i. p. 59 (1857); *id.* Proc. Zool. Soc. 1865, p. 493. Lang, Ent. Mo. Mag. 1868, p. 33. Butler, Ann. Nat. Hist. 1885, p. 407; *id. l.c.* 1888, p. 199. de Nicéville, Rept. Pamir Boundary. Comm. p. 43 (1898); *id.* Journ. Bombay N. H. Soc. 1898, p. 589. Dixey, Proc. Ent. Soc. Lond. 1905, p. 37.

*Gonepteryx Carnipennis*, Butler, Ann. Nat. Hist. 1885, p. 407.

Male. Upperside sulphur-yellow, deeper than in *Rhamni*. Forewing with some black scales at the base, and a small ferruginous-red spot on the angle of lower discocellular veinlet ; a slender, mostly continuous, dusky, ferruginous line extending along the extreme costal edge from the costal vein to the apex and outer marginal edge and its cilia, to the middle median veinlet ; each vein tip being indicated by a

darker point. *Hindwing* with a few black scales at the base; a large red lower discocellular spot, variable in size; the outer angle between the lower veins and its adjacent cilia ferruginous-red. Underside pale olivescent-yellow; the extreme marginal markings paler red; the discocellular spots being purple-brown with a pale centre. *Forewing* basally tinged with pale sulphur-yellow. *Hindwing* with the subcostal median and submedian vein thickened, and densely clothed with raised modified scales. *Body*, legs, and palpi, pale yellow; abdomen above blackish; thorax above clothed with long silky-white hairs; antennæ reddish.

Female. Upperside pale olivescent-white; extreme marginal markings blackish; discocellular spot paler. Underside pale olivescent-white; discocellular spot similar; basal area of forewing white. *Hindwing* with the subcostal median and submedian vein thickened and scaled as in male.

Expanse, ♂ ♀  $2\frac{1}{2}$  to  $2\frac{3}{4}$  inches.

HABITAT.—N. W. Himalayas; Nepal.

DISTRIBUTION.—Capt. A. M. Lang records it as being “abundant in the N. W. Himalayas from 3,000 to 10,000 feet elevation” (P. Z. S. 1865, 493). “It is very common in gardens at Kasauli; also in woods all the way to Kotgarh” (*id. MS. Notes*). Mr. W. S. Atkinson possessed specimens taken at Pir Pinjal and Wardun Valley, Kaschmir. Dr. G. B. Longstaff found it very “abundant in October, throughout the journey from Simla (7,200 feet) to Fagu (8,200 feet), being especially common at Theog, 7,400 feet elevation (Tr. Ent. Soc. 1905, p. 64). Mr. P. W. Mackinnon found it “very common in Masuri from April to November; the larva feeds on *Rhamnus Dahiricus* (N.O. *Rhamneæ*)” (J. Bombay N. H. S. 1898, 589). Mr. H. Grose-Smith has specimens taken in Gilgit. It was also “taken in Chitral during the Pamir Boundary Mission” (Report, p. 43). Specimens from Narkunda, taken by Capt. H. McArthur, are in Mr. J. H. Leech’s Collection. Males from Ladak, and from Shushi Kuh Valley, Chitral, are in the British Museum. Col. J. W. Yerbury found it “common round Campbellpur in the spring; also in the Chach Plain on the banks of the Indus, at Murree, and Thundiani. Specimens were also taken at Akhor and Chittar Pahar in April, at Hassan Abdal in May, and at Thundiani in August” (Ann. N. H. 1888, 199). Mr. W. Doherty obtained it in “Kumaon generally, from 3,000 to 8,000 feet elevation” (Journ. A. S. Beng. 1886, 136). We possess specimens from Nepal, taken by Gen. G. Ramsay. It is not recorded from Sikkim by Mr. Elwes or by Mr. de Nicéville.

#### COLIAS ZANEKA.

Plate 560, fig. 1, 1a ♂, 1b, c ♀.

*Gonepteryx Zaneka*, Moore, Proc. Zool. Soc. 1865, p. 493, pl. 31, fig. 18, ♂. Doherty, Journ. As. Soc. VOL. VII.

Bengal, 1886, p. 136. Butler, Ann. Nat. Hist. 1888, p. 119. de Nicéville, Journ. Bombay N. H. Soc. 1898, p. 589. Dixey, Proc. Ent. Soc. 1905, p. 38.

*Gonepteryx Wallichii*, Lang. Ent. Mo. Mag. 1864, p. 101.

Both sexes with the middle of the costa of *forewing* slightly constricted or depressed, and the apex more prolonged and acutely pointed; the *hindwing* more deeply and broadly dentated than in *Nepalensis*. Both sexes also with the costal and outer area of both wings more or less wrinkled with transverse impressed strigæ between the veins; and the subcostal median and submedian vein of the *hindwing* thickened, and clothed beneath with raised scales.

Male. Upperside. *Forewing* sulphur-yellow; a few black scales at the base; extreme costa anteriorly, and outer margin anteriorly with its cilia, more or less very slenderly edged with ferruginous-black scales, the vein tips being indicated by a more distinct pointed dot; the discocellular ferruginous-red spot very small. *Hindwing* pale olivescent yellowish-white; a few black scales at the base; the tip of lower veins, and cilia, ferruginous-black; discocellular ferruginous-red spot small, somewhat triangular. Underside pale olivescent yellowish-white; discocellular spot purplish-black; vein tips as above. *Forewing* with a subapical excurved series of four or five minute black-scaled very slender short streaks, one in each interspace. *Hindwing* also with a lower discal similar series of minute black dots.

Female. Upperside. Both wings pale olivescent yellowish-white, impressed with strigæ as in the male; discocellular spot paler; vein tips less distinct. Underside paler; vein tips distinct; discocellular spot much paler. *Forewing* with subapical series of minute streaks, and *hindwing* with lower discal dots as in male. *Body* white; abdomen above blackish; antennæ greyish-black above, whitish beneath.

Expanse, ♂ 2 to  $2\frac{1}{2}$ , ♀ 2 inches.

HABITAT.—N. W. Himalayas.

DISTRIBUTION.—Capt. A. M. Lang writes (Epist. July, 1865), "This is an inhabitant of rich forests 6,000 to 8,000 feet elevation, in Upper Kunawur. I have seen it only in the thick dark forests about Kotgurh and Narkunda. I have also taken it in Narkunda and Phagoo from April to June. It is a wonderful insect for remaining always in a normally battered faded condition. I have seen a good many this year (1865) and last year, but not one specimen could I keep, so utterly worn and poor were they all." Specimens from Narkunda, taken in October, and Jalouri Pass in May, are in Mr. J. H. Leech's Collection. Mr. P. W. Mackinnon records it as "rare; occurring in Masuri, and in the interior from April to August" (J. Bombay N. H. S. 1898, 589). Mr. W. Doherty obtained it at "Naini Tal, Lohughat, in Kumaon, at 6,000 to 8,000 feet elevation" (J. A. S. Beng. 1886, 136). We verified a specimen in Mr. W. S. Atkinson's Collection, labelled "Nowboog, Kaschmir,

7,000 feet." Col. J. W. Yerbury captured it at Thundiani in April, September and October.

#### COLIAS CHITRALENSIS.

Male. Upperside. *Forewing* with the pale sulphur-yellow area restricted to less than the basal half; discocellular spot less distinct and dull coloured. *Hindwing* basally tinged with pale sulphur-yellow.

Expanse, 2 to  $2\frac{1}{4}$  inches.

HABITAT.—Chitral.

DISTRIBUTION.—Specimens taken at Jhela Drosch, Chitral, by Capt. S. W. Harris, and from the Shishikuh Valley in July and August, at 9,000 to 14,000 feet elevation by Capt. G. H. Colomb, are in the British Museum Collection.

#### COLIAS ZANEKOIDES.

Plate 560, fig. 2, 2a ♂, 2b, c ♀.

*Gonepteryx Zanekoides*, de Nicéville, Journ. As. Soc. Bengal, 1897, p. 564, pl. 1, fig. 2, ♂, 7 ♀.

Male. "Differs from the same sex of *Zaneka* in having the *forewing* markedly broader, the costal margin not constricted at half its length, but straight, the apex not so produced. *Hindwing* distinctly broader, almost of the same shade of brimstone as the *forewing*, the outer slightly paler than the basal half of the wing, in *Zaneka* it is pale cream colour of a uniform shade.

Female. *Forewing* agrees in shape with the male, consequently differs from the same sex of *Zaneka* in being broader with a straight instead of excavated costa, and the apex less produced. The highly dentate *hindwing* in both sexes will distinguish *Zaneka* and *Zanekoides* from *Aspasia*."

Expanse, ♂ 2·1 inches.

HABITAT.—Upper Burma.

DISTRIBUTION.—"Described by Mr. de Nicéville from specimens captured by Mr. L. A. Thurston, at 7,000 feet elevation in the Southern Chin Hills, during the rains. Capt. E. Y. Watson also has a specimen in his Collection. Geographically, *Zaneka* and *Zanekoides* are widely separated, and it is highly improbable that any species linking them together will be found in the mountains which lie between the Western Himalayas and Upper Burma" (l.c. 565).

NOTE.—Dr. N. Manders (Tr. Ent. Soc. 1890, p. 534) notices a "*Gonepteryx Himalayensis*" which he took in the Shan States, in April and September. We do not know of any published description of a "*Gon. Himalayensis*," and, as *Zanekoides* is the only Burmese species of the genus, it is possibly the one to which he refers.

## CHINA AND JAPAN SPECIES.

*Colias maxima* (*Gonepteryx maxima*, Butler, Ann. Nat. Hist. 1885, p. 407. Pryer, Rhop. Nippon, p. 7, pl. 2, fig. 5 (1886). G. Rhamni, var. Leech, Butt. China and Japan, p. 439, pl. 35, fig. 4 ♂ ? (1893). *Habitat.* W. and E. China; Korea; Japan.

*Colias acuminata* (*Gonepteryx acuminata*, Felder, Wien. Ent. Monat. vi. p. 23 (1862). Pryer, Rhop. Nippon, p. 7, pl. 2, fig. 6 (1886). Leech, Butt. China, &c., p. 443 (1893).

*Colias Amintha* (*Gonepteryx Amintha*, Blanchard, Comp. Rend. 1871, p. 810). *Habitat.* Moupin.

*Colias Alvinda* (*Gonepteryx Alvinda*, Blanchard, l.c. p. 810. *Habitat.* Moupin.

## Genus DERCAS.

*Dercas*, Doubleday, Gen. D. Lep. i. p. 70 (1847). Moore, Catal. Lep. Mus. E. I. Company, i. p. 59 (1857). Butler, Cistula Ent. i. p. 54 (1870). Distant, Rhop. Malayana, pp. 287, 308 (1885). Leech, Butt. of China, Japan, &c. p. 445 (1893). Kirby, Allan's Nat. Libr. Butt. ii. p. 224 (1896). de Nicéville, Ann. Nat. Hist. 1898, p. 78).

Male. *Forewing* subtriangular, short, very broad; costa very much arched from the base, apex with an acute projected point—more prolonged and acute in the female; outer margin very slightly oblique and dentated below the apex, posterior margin slightly curved from the base and thence almost straight to the angle; cell short, extending to less than half the wing, broad; costal vein reaching to nearly middle of margin; first subcostal branch emitted at one-fourth and second immediately before the end of the cell, fourth from below the third at half its length and ending before the apex, fifth (or upper radial) at one-third beyond the cell; upper discocellular short, lower long, each concave, angled above the middle, the lower radial from the angle; middle median near end of the cell. *Hindwing* short, very broad, quadrate; costa broadly lobate at the base, obliquely-convex outward, apex obliquely angled, exterior margin broadly produced and angled at end of upper median veinlet, its upper and lower edge almost straight, anal angle pointed, both angles being more produced in the female; cell short; precostal vein bent inward at about its middle; costal vein rather short; first subcostal branch from near upper end of the cell; discocellars very oblique, the upper short, lower long and concave at its upper end, the radial from the angle; middle median from near end of the cell; submedian vein straight, ending at anal angle; internal vein recurved. *Body* stout; thorax above clothed with fine silky hairs; palpi short, compressed, com-

pactly clothed beneath with fine hairs; antennæ somewhat slender, with a gradually thickened blunt-tip club.

TYPE.—D. Verhnell [Doubledayi].

**DERCAS WALLICHII.**

Plate 561, fig. 1, 1a, b ♂, 1c, d ♀.

*Gonepteryx Wallichii*, Doubleday, Proc. Ent. Soc. v. p. 47 ♂ (1818).

*Rhodocera Wallichii*, Butler, Proc. Zool. Soc. 1866, 452.

*Dercas Wallichii*, Wallace, Trans. Ent. Soc. 1867, p. 398. Elwes, Proc. Zool. Soc. 1882, p. 402; *id.*

Tr. Ent. Soc. 1888, p. 415. Leech, Butt. of China, &c. p. 446 (1893). de Nicéville, Sikkim Gaz. 1894, p. 167; *id.* Ann. Nat. Hist. 1898, p. 482.

*Gonepteryx Urania*, Butler, Proc. Zool. Soc. 1865, p. 458, pl. 26, fig. 5 ♀.

*Dercas Urania*, Swinhoe, Tr. Ent. Soc. 1893, p. 308.

Male. Upperside sulphur-yellow. *Forewing* with a small black somewhat quadrate apical patch, reaching to the upper radial, below which it marginally extends narrowly and sinuously to beneath the upper median veinlet, and followed by a very small spot on the middle median and then a dot on the lower median; anteriorly the patch is slenderly continued sinuously and interrupted along the costa to tip of the costal vein; a large black rounded discal spot placed somewhat inwardly-oblique between the upper and middle medians, this spot being more or less indistinctly and narrowly bordered posteriorly by ferruginous, a few similar coloured scales also forming a short obsolescent fascia below it. *Hindwing* with a minute black dot at end of the veins. Underside somewhat paler yellow than above. Both wings basally sprinkled with a few ferruginous dots, and a small bilobed, or geminate ferruginous discocellular mark, bipupilled with glossy-white. *Forewing* with the apical and marginal markings more restricted, ferruginous, the apical patch centred with a glossy-white streak; the discal rounded spot dark ferruginous, inwardly bordered with blackish scales, its centre being paler ferruginous; a narrow ill-defined ferruginous-scaled oblique discal sinuous fascia extends from the apical patch to the discal spot and then below it to near the submedian vein. *Hindwing* with a basal ferruginous spot centred with glossy-white; a transverse discal ill-defined narrow ferruginous sinuated fascia, which is bent inward at the middle median, each portion of which between the veins being marked inwardly by a dark lunate dot; a similar marked ferruginous spot is also present in the costal interspace above end of the cell, and one also basally between the lower median and submedian; veins with a black dot at their tip.

Female. Upperside much paler, somewhat whitish basally. *Forewing* with black markings, similar to the male, except that the outer band is more restricted, deeply sinuate below the apex, and more macular posteriorly, the discal spot is also

somewhat larger. *Hindwing* with a black dot at end of the veins. Underside with all the markings as in the male.

Expanse, ♂  $2\frac{1}{2}$  to  $2\frac{3}{4}$ , ♀  $2\frac{3}{4}$  inches.

HABITAT.—Sikkim; Assam; Khasia and Naga Hills; Central China.

DISTRIBUTION.—Mr. H. J. Elwes records “a single specimen brought from the interior of Sikkim by native collectors, is the only one I have ever seen or heard of from Sikkim” (Tr. Ent. Soc. 1888, 415). Col. C. Swinhoe has received “several examples of both sexes from his native collectors in the Khasia Hills” (Tr. Ent. Soc. 1893, 308). Mr. L. de Nicéville has specimens from the Lachung Valley in Native Sikkim, the Khasia Hills and Upper Assam” (Ann. N. H. 1898, 482). Mr. W. Doherty notes that he obtained “a large series of *D. Wallichii*, at or near Mao, Manipur. It flew in June and disappeared in July” (P. Z. S. 1891, 251). Col. C. T. Bingham has a male taken at Themaghat, Assam, in June.” In Mr. J. H. Leech’s Collection are specimens from Omei Shan, Chang Yang, and Kwei Chow, Central China.

#### DERCAS LYCORIAS.

Plate 561, fig. 2, 2a ♂.

*Rhodocera Lycorias*, Doubleday, Gray’s Zool. Misc. p. 77 ♂ (1842); nec. ♀.

*Gonepteryx Lycorias*, Doubleday, Gen. D. Lep. i. p. 71 ♂ (1847).

*Dercas Decipiens*, de Nicéville, Ann. Nat. Hist. 1898, pp. 480, 483 ♂.

*Dercas Brindaba*, Swinhoe, Ann. Nat. Hist. 1899, p. 107 ♂.

Male. Upperside similar to the same sex of *D. Wallichii*, except that in the forewing the large rounded discal black spot is absent, a very few ferruginous scales being slightly visible transversely in the upper and lower median interspaces, and the apical patch comparatively smaller. Underside also similar to *Wallichii*, except that in the forewing the discal rounded spot is absent, the ferruginous fascia being uniform in its entire course.

Female. Unknown.

Expanse, ♂  $2\frac{9}{10}$  to  $2\frac{1}{10}$  inches.

HABITAT.—Khasia Hills.

DISTRIBUTION.—The male type specimen of *Lycorias*, described by Mr. E. Doubleday, is recorded from Silhet. Our specimens, under examination, from the Khasia Hills, entirely agree with his description. Mr. L. de Nicéville records his specimens of *decipiens* from the “Khasias, where it appears to be as numerous as *D. Wallichii*. The Rev. W. A. Hamilton having sent me many examples of both species from thence, which were obtained by his native collectors” (Ann. N. H. 1898, 483). Col. C. Swinhoe’s type of *Brindaba* were also taken in “the Khasia Hills, from whence

numerous examples were received by him from his native collectors" (Ann. N. H. 1899, 107).

### DERCAS DOUBLEDAYI.

Plate 562, fig. 1, 1a, b, c ♂, d, e ♀.

*Dercas Verhuellii*, Doubleday, Gen. D. Lep. i. p. 71, pl. 8, fig. 3 ♂ (1847); *id.* List Lep. Brit. Mus. App. p. 10 (1848). Moore, Catal. Lep. Mus. E. I. Company i. p. 59 (1857). Butler, Cist. Ent. i. p. 45 (1870). Elwes, Tr. Ent. Soc. 1888, p. 414. de Nicéville, Sikkim Gaz. 1894, p. 167. Swinhoe, Tr. Ent. Soc. 1893, p. 308. Watson, Journ. Bombay N. H. Soc. 1897, p. 671. Adamson, List Burm. Butt. p. 42 (1897). de Nicéville, Ann. Nat. Hist. 1898, p. 480; *id.* Journ. Bombay N. H. Soc. 1899, p. 334.

*Rhodocera Lycorias* (pt.), Doubleday, Gray's Zool. Misc. pp. 77, 78, fig. ♀ (1842).—*nec.* ♂.

Male. Upperside deep sulphur-yellow. *Forewing* with a large somewhat quadrate vinaceous-black apical patch, which continues narrowly and decreasingly sinuously hindward, from above lower radial veinlet to below the lower median; the patch slightly varies in size, and its inner anterior side is slightly outwardly-oblique and uneven, its upper angle extending inward very slenderly and interruptedly along the costal edge to tip of the costal vein, and its entire inner edge from the costa hindward is bordered by a narrow pale ochreous-red band; a similar-coloured narrow transverse discal fascia also extends from the inner lower angle of the black patch obliquely to the submedian vein; a pale ochreous-red recurved streak also borders the discocellulars; cilia anteriorly ochreous-red. *Hindwing* with a black dot at end of each vein. Underside paler yellow. *Forewing* with markings, as on upperside, purplish-red, the apical portion of outer band washed with dark purple-grey and crossed by a glossy violet oblique streak, the whole traversed by darker slender strigæ; centre of the discocellular streak glossy violet and its base dark purple, the transverse discal fascia pale and inwardly edged with dark purple-grey. *Hindwing* with a black dot at end of the veins, a slightly-defined transverse discal purple-red fascia extending straight from the costal vein to middle median and then bent inward to lower median, its inner edge being more distinct; a discocellular similar coloured trilobed mark with glossy violet centre.

Female. Upperside pale olivescent yellowish-white. *Forewing* with the apical patch and marginal band blacker, the patch somewhat longitudinally narrower and its lower inner angle prolonged inward, the ochreous inner border absent, and the discal fascia obsolescent. *Hindwing* with a black dot at end of the veins. Underside very pale sulphur-yellow, the markings as in male; the apical band of forewing paler.

Expanse, ♂  $2\frac{1}{2}$  to  $2\frac{3}{4}$ , ♀  $2\frac{3}{4}$  to 3 inches.

HABITAT.—Sikkim; Bhotan; Assam; Cherra Pungi; Khasias; Manipur; Burma; Upper Tenasserim.

DISTRIBUTION.—Mr. H. J. Elwes records it as “not uncommon in Sikkim, in certain places, up to 4,000 feet elevation, from May to October” (Tr. Ent. Soc. 1888, 414). We possess both sexes from Bhotan. Col. C. Swinhoe observes “common in the Khasia Hills” (Tr. Ent. Soc. 1893, 308). Specimens from Manipur, taken by Dr. G. Watt, are in the British Museum. Col. C. H. E. Adamson writes, “this is a rare butterfly in Burma. I have only seen one specimen, which I captured in April at Tounggya Sekkan” (List, p. 42). Mr. T. A. Hauxwell obtained “a single male on the Taungoo Hills, 4,000 feet elevation, in May, and since this another in the Chindwin Valley” (J. Bombay N. H. S. 1899, 334). Col. C. T. Bingham has a single specimen, taken at Taungjah, Daunat Range in April. Capt. E. Y. Watson obtained two specimens in the Chin Hills, 3,000 feet elevation in the rainy season” (J. Bombay N. H. S. 1897, 671). Dr. Leonardo Fea took it in the Karen Hills, in August.

#### INDO-MALAYAN AND CHINA SPECIES.

*Dercas Verhuellii* (Colias Verhuellii, Van der Hoeven, Tijd. voor Nat. Gesch. en Phys. v. p. 341, pl. 8, fig. 3, 3a ♀ (1839). *Dercas Verhuellii*, Fruhstorfer, Deuts. Ent. Zeit. Iris, 1902, p. 275; *id.* Soc. Ent. 1903, p. 25. Forewing with the apical patch in both sexes longitudinally longer and transversely narrower than in *D. Doubledayi*. *Habitat.* S. China; Hongkong.

*Dercas Skertchlyi*, de Nicéville, Ann. Nat. Hist. 1898, p. 481, ♂ ♀. “Differs from *Verhuellii*, in the forewing lacking on both surfaces the large apical patch. In *Skertchlyi* the costa from about the middle to the apex of the wing, and thence as far as the termination of the first median nervule, has a narrow black border of about equal breadth throughout. Otherwise the two species do not differ. This cannot be a seasonal form of *Verhuellii*, as both species fly together in Hongkong in May, which is the only month in which Mr. E. F. Skertchly has obtained it. It seems to be fairly common in the Island.” *Habitat.* Hongkong.

*Dercas difformis*, de Nicéville, Ann. Nat. Hist. 1898, p. 483, ♂ ♀. *Syn.* *D. Wallichii*, Leech, Butt. of China, &c. p. 445, pl. 35, fig. 3 ♂ (1893). *D. Enara*, Swinhoe, Ann. Nat. Hist. 1899, p. 107, ♂ ♀. *Habitat.* C. and W. China.

*Dercas Gobrias* (Gonepteryx Gobrius, Hewitson, Trans. Ent. Soc. 1864, p. 246, pl. 16, fig. 1 ♂. Butler, Pr. Zool. Soc. 1865, p. 432, pl. 25, fig. 4 ♂. Vollenhoven, Mon. Pieridæ, p. 63 (1865). Druce, P.Z.S. 1873, p. 356. *Dercas Gobrias*, Wallace, Tr. Ent. Soc. 1867, p. 398. Distant. Rhop. Malay. p. 308, pl. 26, fig. 18 ♂ (1885); *id.* Ann. Nat. Hist. 1887, p. 271. de Nicéville, Journ. As. Soc. Bengal, 1896, p. 500; *id.* Ann. Nat. Hist. 1898, p. 481. *Habitat.* Malay Peninsula; Sumatra; Borneo; ? Java.

## Genus GANDACA.

*Terias* (part), Horsfield; Boisduval; Doubleday; Butler.  
*Euremia* (pt.), Staudinger & Schatz, Exot. Schmett. II. p. 28 (1892).  
*Terias* (group D), Watson, Journ. Bombay N. H. Soc. 1894, pp. 509, 516.  
*Terias* (sect. a), Semper, Reise Phil. Lep. p. 252 (1891).  
*Terias* (sect. I., pt.), Butler, Ann. N. H. 1898, pp. 57, 59.

*Forewing* broader, shorter, and more triangular than in typical *Terias* (*Hecabe*), the exterior margin erect and the apex more obtuse; median vein of male not bordered with dark coloured secondary sexual brands. *Hindwing* also broader and more triangularly oval than in *Terias*, the exterior margin also not being medially somewhat produced—as is quite apparent in both sexes of *T. Hecabe*.

Male. *Forewing* beneath, with an ordinary elongated subbasal patch of glossy-white appressed scales extending from above submedian vein, and below it to basal end of posterior margin. *Hindwing* above, with the costal border clothed with glossy-white appressed scales.

TYPE.—G. Harina.

HABITS.—“This is a true forest butterfly, where it is found, in Sumatra, somewhat rarely, frequenting flowers, together with species of *Zemeros* and females of *Lycaenidae*. It is found throughout our area, with perhaps the exception of the Central Plateau, and flies throughout the year.” (Dr. L. Martin, Journ. As. Soc. Bengal, 1895, 494.)

## GANDACA ASSAMICA.

Plate 563, fig. 1, 1a ♂ ♀ (*Wet*), 2, 2a, b ♂ ♀ (*Dry*).

*Terias Harina*, Wood-Mason, J. As. Soc. Beng. 1886, p. 370. Swinhoe, Trans. Ent. Soc. 1893, p. 307. Elwes, *id.* l.c. 1888, p. 414. de Nicéville, Sikkim Gazetteer, 1894, p. 167. ?Taylor, List of Orissa Butt., p. 13 (1888).

*Terias Harina* (pt.), Butler, Ann. Nat. Hist. 1898, p. 59.

*Wet-season form* (fig. 1 ♂, 1a ♀). Male. Upperside pale sulphur-yellow. *Forewing* with a narrow black apical-marginal decreasing band, which terminates either before or beneath the lower median veinlet, its inner-edge being more or less very slightly sinuated. Underside. Both wings uniformly pale sulphur-yellow.

Female. Upperside white. *Forewing* with the apical marginal black band broader than in male, and its inner-edge distinctly angled at the fifth subcostal branch. Underside very faintly tinted with pale sulphur-yellow.

Expanse, ♂, 2 to  $2\frac{2}{10}$  ♀ 2 inches.

*Dry-season form* (fig. 2 ♂, 2a, b ♀). Male. Upperside. *Forewing* with the

marginal band somewhat more even on its inner-edge. Female. Upperside. *Forewing* with the marginal band similar to male, but somewhat narrower, or conspicuously narrower.

Expanse, ♂  $1\frac{3}{4}$ , ♀  $1\frac{1}{2}$  to  $1\frac{3}{4}$  inch.

HABITAT.—Assam; Lower Sikkim; ? Lower Bengal.

DISTRIBUTION.—“Mr. J. Wood-Mason obtained one male at Dhurmkal in May, and another at Irangmara, Cachar, in August” (J. A. S. Beng. 1886, 370). Colonel C. Swinhoe records it as being “common in the Khasia Hills” (Tr. Ent. Soc. 1893, 307). Colonel C. T. Bligham possesses specimens from Cherra Pungi, taken in October. In the British Museum are examples from Shillong, Silhet, and Sikkim. Mr. H. J. Elwes records it as being “rare in Sikkim, at low elevations, up to about 4,000 feet elevation, from April to December” (Tr. Ent. Soc. 1888, 414).

NOTE.—Mr. W. C. Taylor, in his “List of butterflies taken at Khorda, in Orissa, Lower Bengal,” there records *T. Harina* as an “uncommon butterfly.”

#### GANDACA BURMANA.

Plate 563, fig. 3, 3a, b, c, ♂ ♀.

*Terias Harina*, Watson, Journ. Bombay N. H. Soc., 1888, p. 25; *id. l.c.* 1891, p. 51; 1897, p. 669.

Adamson, List Burmese Butt. p. 42 (1897). †Fruhstorfer, D. E. Z., 1902, p. 301.

*Terias Harina* (pt.), Butler, Ann. Nat. Hist. 1898, p. 59.

*Terias formosa*, Moore, P.Z.S., 1878, p. 836; *id. J. Linn. Soc. Zool.* 1886, p. 45. Elwes, J. As. Soc. Beng. 1887, p. 431.

*Wet-season form* (fig. 3, ♂, 3a ♀). Male. Upperside pale sulphur-yellow. *Forewing* with the black marginal band much broader throughout its length than in the Khasia and Sikkim form, its inner-edge also comparatively more even. *Hindwing* with, or without, a few minute blackish scales medially disposed along the outer margin. Underside pale sulphur-yellow.

Female. Upperside. Both wings with a distinct but faint sulphurent tint. *Forewing* with the marginal band angled at the upper median veinlet. *Hindwing* with the outer margin medially bordered by a narrow band of blackish scales. Underside pale sulphur-yellow.

Expanse, ♂ 2, ♀  $1\frac{3}{4}$  inch.

*Dry-season form* (fig. 3b, ♂; 3c ♀). Male. Upperside. *Forewing* with the black outer band somewhat narrower than in wet-form. Female. Upperside. Both wings with a fainter yellowish tint than in wet-form. *Forewing* with the outer band similar. *Hindwing* unmarked.

Expanse, ♂ 2 inches, ♀  $1\frac{3}{4}$  inch.

HABITAT.—Burma; (? Siam; Annam).

DISTRIBUTION.—Col. C. H. E. Adamson found this butterfly “not uncommon in the north and west of Upper Burma, but rare in Lower Burma, where only a very few specimens were taken in November and December” (List, p. 42). There are specimens in the British Museum from Beeling, Upper Tenasserim, taken by Capt. E. Y. Watson; Malawoon, Rangoon, Tongoo; and from the Donat Range, Tenasserim, taken by Col. C. T. Bingham. Mr. O. Limborg obtained it at “Hatsiega, Upper Tenasserim” (P. Z. S., 1878, 836). Dr. L. Fea took it at Bhamo, in November. Capt. E. Y. Watson records it as “fairly common in the Upper Chindwin District during April and May” (l.c. 1897, 669).

#### GANDACA ANDAMANA.

Plate 563, figs. 4, 4a, b, c, ♂ ♀.

*Terias formosa*, Moore, Pr. Zool. Soc. 1877, p. 590 (nec Hübner).

*Terias Harina*, Wood-Mason, Journ. As. Soc. Bengal, 1880, p. 235; *id. l.c.* 1881, p. 251.

*Terias Harina* (pt.), Butler, Ann. Nat. Hist., 1898, p. 59.

*Wet-season form* (fig. 4, ♂, 4a, ♀). Male. Upperside pale sulphur-yellow. *Forewing* with a somewhat narrower outer marginal black band than in the Burmese form, its end terminating at the lower median branch. Female. Upperside white. *Forewing* with a slightly broader black outer band than in Burmese female, its lower end reaching the posterior angle. *Hindwing* with a more or less defined slender blackish-scaled marginal medial band. Underside very pale sulphur-yellow.

Expanse, ♂ 2, ♀  $1\frac{3}{4}$  to 2 inches.

*Dry-season form* (fig. 4b ♂, 4c ♀). Male. *Forewing* with the black outer band narrower than in *wet* form. Female. Upperside white. *Forewing* with the black outer band of similar shape and width as in *wet* form, and terminating at the posterior angle. *Hindwing* with a very few medially-disposed marginal black scales slightly perceptible.

Expanse, ♂  $1\frac{1}{2}$  to  $1\frac{3}{4}$ , ♀  $1\frac{1}{2}$  inch.

HABITAT.—Andaman and Nicobar Islands.

DISTRIBUTION.—This species was first obtained by Mr. F. A. de Rœpstorff, at “Port Blair, Andamans” (P. Z. S., 1878, 590).

INDO-CHINA, MALAY, AND PHILIPPINE SPECIES.—*Gandaca Annamica* (*Terias Harina*, Fruhstorfer, Deuts. Ent. Zeit. 1902, p. 301. *Habitat.* Annam; Siam; (? Hainan).

*Gandaca Distanti* (*Terias Harina*, Distant, Rhop. Malay., p. 307, pl. 25, fig. 13 ♂ (1885). de Nicéville, J. As. Soc. Beng., 1895, p. 494. *Habitat.* Malay Peninsula; Sumatra; Nias (? Borneo).

*Gandaca Dohertyi* (*Terias Harina*, Doherty, J. As. Beng., 1891, p. 29. Fruhstorfer, Berl. Ent. Zeit. 1904, p. 202. *Habitat.* Engano Island.

*Gandaca Harina* (Terias Harina, Horsfield, Catal. Lep. Mus. E. Ind. Compy., p. 137, ♂ ♀ (1829). Boisduval, Spéc. Gén. Lep. I., p. 668 (1836). Doubleday, Gen. D. Lep. p. 79 (1847). Eurema formosa, Hübner, Zutr. Exot. Schmett. figs. 979-80, ♂ (1837). *Habitat.* Java.

*Gandaca Palawanica* (Terias Harina, Staudinger, Lep. Pal. p. 18 (1889). *Habitat.* Palawan.

*Gandaca Mindanaensis* (Terias Harina, Semper, Reise Phil. Lep. p. 253 (1892). *Habitat.* Mindanao.

*Gandaca curiflava* (Terias auriflava, Fruhstorfer, Berl. Ent. Zeit. 1898, p. 430. *Habitat.* Sula Isles.

#### Genus KIBREETA.

*Abysis* (pt.), Hübner, Verz. bek. Schmett. p. 97 (1816).

*Terias* (pt.), Horsfield; Boisduval; Doubleday; Butler; Moore.

*Terias* (group C.), Watson, Journ. Bombay Nat. Hist. Soc. 1894, pp. 509, 515.

*Terias* (sect. 1, pt.), Butler, Ann. Nat. Hist. 1898, p. 57.

Male. *Forewing* subtriangular. Underside with a glossy-white rounded appressed-patch of scales extending from above the submedian vein, near its base, and below it to the extreme base of the wing. *Hindwing* obtusely oval, comparatively more produced apically than in typical *Terias*. Upperside with the costal border clothed with appressed glossy-white scales.

*TYPE.*—*K. Libythea*.

#### KIBREETA LIBYTHEA.

Plate 564, figs. 1, 1a, b, c, d, e, f, g, ♂ ♀.

*Papilio Libythea*, Fabricius, Ent. Syst. Suppl. p. 427 (1798).

*Terias Libythea*, Butler, Catal. Fabr. Butt. B.M. p. 227 (1867). Watson, Journ. Bombay N. H. Soc. 1894, p. 515. de Nicéville, J. As. Soc. Beng., 1889, p. 211; *id. l.c.* 1902, p. 26.

*Terias Libythea* (part), Butler, Ann. Nat. Hist., 1898, p. 58. Mackinnon, J. Bombay, N. H. S. 1898, p. 588.

*Terias Drona*, Moore, Lep. Ceylon, i. p. 120, pl. 46, fig. 3, 3a, ♂ ♀ (1881). Rothney, Ent. Mo. Mag. 1882, p. 35. Taylor, List Orissa Butt. p. 15 (1888). de Nicéville, Journ. As. Soc. Bengal, 1885, p. 50, 236. Hampson, J. A. S. Beng. 1886, 361. Swinhoe, P. Z. S. 1885, p. 135; *id.* 1886, p. 430. Doherty, Journ. As. Soc. Bengal, 1886, p. 135. Davidson and Aitken, J. Bombay N. H. Soc. 1896, p. 571. de Nicéville, J. A. S. Beng. 1900, p. 252. Watson, J. Bombay N. H. S. 1890, p. 7. Ferguson, J. Bombay N. H. S. 1891, 443.

*Wet-season form* (fig. 1, 1a ♂, 1b ♀). Male. Upperside yellow; basal areas sparsely irrorated with greyish-black scales; cilia yellow. *Forewing* with a broad vinescent-black outer marginal band, which curves from before middle of the costa

to upper median branch, below which it is sinuated, and ends broadly at the posterior angle; the veins crossing the band are generally more distinctly black-lined, and the extreme edge of the apex between the subcostals, and also their cilia, is very slightly yellow. *Hindwing* with the costal border glossy-white; a broad black continuous sinuous-edged outer marginal band. Underside paler yellow. Both wings with the tip of all the veins black scaled; cilia yellow. *Forewing* with the discocellular veinlet marked by a minute upper and lower black spot—which are connected on each side of the veinlet by a less distinct slender line; a glossy white rounded appressed patch of scales extending from above submedian vein near base, and below it to the extreme base. *Hindwing* sparsely indistinctly-irrorated with minute dusky scales; a cluster of these scales form an indistinct subapical spot, also an upper and lower oblique discal sinuous fascia, and two minute black subbasal spots between the costal and subcostal veins, one near base of cell and one between base of median and submedian vein.

Female. Upperside. Both wings duller yellow, and basally indistinctly irrorated with minute dusky scales; the marginal bands paler. *Forewing* with similar-shaped outer band. *Hindwing* with the outer band somewhat broader, its sinuous inner-edge defined by scattered scales. Underside irrorated as in the male.

Expanse ♂ 9  $1\frac{6}{10}$  to  $1\frac{8}{10}$  inch.

*Intermediate form* (fig. 1c, d, ♂, 1e, ♀). Male. Upperside similar to *wet form*. *Forewing* with the band slightly narrower and its inner-edge more acutely sinuated. *Hindwing* also with the band narrower. Underside also similar, the markings, except at the vein tips and discocellolars, less apparent.

Female. Upperside. *Forewing* also with the band more acutely sinuated; and the band on the *hindwing* comparatively narrower. Upperside similar to the male.

Expanse, ♂ 9  $1\frac{4}{10}$  to  $1\frac{6}{10}$  inch.

*Dry-season form* (fig. 1f, ♂, 1g ♀). Much smaller than *intermediate form*. Male. Upperside. Both wings with the band narrower than in the *intermediate form*. Underside with the markings slightly more distinct. Female. Upperside similar to the *intermediate form*, except that the band on the *hindwing* is less defined and somewhat macular. Underside similar to *intermediate form*.

Expanse, ♂ 9  $1\frac{2}{10}$ ; ♀, 1 to  $1\frac{3}{10}$  inch.

**HABITAT.**—Western Himalayas; Western, Eastern and Southern India; Ceylon; Nicobars; ? Hongkong.

**DISTRIBUTION.**—“This is very common in the Western Himalayas. We obtained five specimens in Masuri, and twenty-five in the Dun, of the dry-season form, typical *Libythea*, and six from Masuri, eleven from the Dun of the wet-season form, *T. Drona*” (P. W. Mackinnon, l.c. 588). Specimens in the late W. S. Atkinson’s Collection were labelled “Dehra, Chamba, and Kashmir.” In Mr. J. H. Leech’s

Collection are males and females from "Rajaori, 4,000 feet, taken in September, and others from Kakri." Mr. W. Doherty obtained it at "Bhagheswa, Almora, and Naini Tal, from 3,000 to 6,000 feet elevation, in Kumaon" (l.c. 1886, 135). Col. C. Swinhoe records it from Poona, Bombay, taken in November and December," also taken at "Mhow, Central India, in September, October, and November" P. Z. S., 1885, 135, *id.* 1886, 430). Messrs. Davidson & Aitken record it as "fairly common in many parts of the Kanara District, Bombay, but does not seem to appear till the monsoon is over. The larva is not distinguishable to us from that of *T. Hecabe*, the pupa is shorter and has the snout slightly upturned. It feeds on a Leguminous plant, *Cassia pumila*" (J. Bombay N. H. S., 1896, 571). Capt. E. Y. Watson obtained it "in Mysore in October, November, and January" (J. Bomb. N. H. S., 1890, 7). Mr. G. F. Hampson records it from the Nilgiris (l.c. 1888, 361). Mr. W. C. Taylor records it as "not common at Khoorda, in Orissa" (List, p. 14). Mr. J. Rothney found it "rare in Calcutta during the rains" (Ent. Mo. Mag., 1882, 35). Mr. L. de Nicéville also records its capture in the "neighbourhood of Calcutta") J. A. S. Beng., 1885, 50). In Ceylon, it is recorded as being "found in the Hills, at 2,000 to 4,000 feet elevation, as a rule near *Patnas*, or short grass land" (Lep. Cey. 1, 120). Dr. N. Manders states that it is "common in Ceylon, in open country, between 2,000 to 5,000 feet elevation" (J. A. S. Beng. 1899, 211).

Of our illustrations on Plate 564, figs. 1, 1a, b, are from male and female *wet* form, from Simla; figs. 1c, d, e, male and female *intermediate* form, and figs. 1, f, g, male and female *Dry* form from S. India.

#### KIBREETA RUBELLA.

Plate 564, fig. 2, 2a, b, c, d, e, f, g, ♂ ♀.

*Terias rubella*, Wallace, Trans. Ent. Soc. 1867, p. 323, ♂. Moore, Proc. Zool. Soc. 1882, p. 253. de Nicéville, Journ. As. Soc. Bengal 1885, p. 50. Swinhoe, P. Z. S. 1885, p. 136; *id.* 1886, p. 430. Taylor, List of Orissa Butt. p. 14 (1888). Elwes, Tr. Ent. Soc. 1888, 413. Hampson, J. A. S. Beng. 1888, 361. Ferguson, Journ. Bombay N. H. Soc. 1891, p. 443. Watson, *id.* 1894, p. 515.

*Terias Libythea* (pt.), de Nicéville, Sikkim Gaz. 1894, 167. Butler, Ann. Nat. Hist. 1898, p. 58. Mackinnon, J. Bombay N. H. Soc. 1898, p. 588.

*Wet-season form* (fig. 2, 2a, ♂, 2b, c, ♀). Male. Upperside somewhat paler yellow than in *Libythea*. Forewing with the outer marginal black band similar, but blacker, and slightly narrower posteriorly; the apical edge of costa and the cilia rosy-red. Hindwing with the black outer band somewhat narrower, macular, the decreasing portions each with a more prolonged inner-tooth, and the yellow ground-colour between each extending to the outer edge. Underside pale yellow; markings similar to but slightly more distinct than those in *Libythea*, the forewing also

having a very slightly defined subapical inwardly-oblique squamous streak. *Forewing* with the entire costal edge and outer marginal cilia, and also the outer marginal cilia of the *hindwing*, rosy-red.

Female. Upperside. Apical edge between the subcostals of *forewing*, and cilia of both wings paler rosy-red. Underside with the markings on *hindwing* slightly visible. *Forewing* above with the black outer band broken beneath the lower median veinlet. *Hindwing* with the outer band similar to male, its portions slightly broader. Underside similar to male, the markings being slightly more defined.

Expanse, ♂  $1\frac{9}{10}$ , ♀  $1\frac{8}{10}$  inch.

*Intermediate form* (fig. 2d ♂, 2e ♀ = *rubella* types). Male. Upperside. *Forewing* with the outer band slightly narrower than in *wet* form; cilia paler red. *Hindwing* with the marginal macular band narrower, and composed of smaller portions. Underside similar to *wet* form.

Female. Upperside. *Forewing* with the outer band less broken at its posterior end than in *Wet-form*. *Hindwing* with the marginal macular band less distinct and narrower. Underside similar to the male.

Expanse, ♂ ♀  $1\frac{4}{10}$  inch.

*Dry-season form* (fig. 2f ♂, 2g ♀). Both sexes much smaller than in *intermediate* form. Cilia paler. Male. *Forewing* above with the inner-edge of the marginal band less situated than in *intermediate* form, its posterior end indistinctly broken. *Hindwing* with the lower portions of the macular band somewhat larger and less dentate. Underside. Both wings with less defined markings than in *intermediate* form.

Female. Upperside. *Forewing* with the band slightly broken at posterior end. *Hindwing* with the lower portions of band somewhat wider. Underside with the markings indistinct.

Expanse, ♂ ♀  $1\frac{2}{10}$  inch.

**HABITAT.**—Western and Eastern Himalayas; Western, Southern, and Eastern India.

**DISTRIBUTION.**—We possess specimens from Simla, Kasauli, and Kangra, Western Himalaya; Assighur, N.E. Bombay, taken in October; Giridih and Sahebgung, Bengal; also the type male and female, labelled "Calcutta" ex Coll. W. S. Atkinson; also a male from Sikkim, taken in April by Mr. G. C. Dudgeon; specimens from Mhow, Poona, and the Nilgiris. Col. C. Swinhoe obtained it in Bombay at "Poona October to April, Belgaum September and October, Sattara October and November, and at Mhow, Central India, in great numbers from October to April" (P. Z. S. 1885, 136; 1886, 430). Mr. G. F. Hampson obtained it in the Nilgiris. (J. A. S. Beng. 1888, 361). Mr. H. S. Ferguson took it in "Travancore Hills at 2,000 to 4,000 feet elevation" (l.c. p. 443). Mr. W. C. Taylor records it as

"common at Khorda in Orissa, Lower Bengal" (List, p. 14). Mr. L. de Nicéville obtained it in "the neighbourhood of Calcutta" (J. A. S. Beng. 1885, 50), and records it as being "found in Sikkim only at the foot of the Hills, being rare almost throughout the year" (Sikkim Gaz. 1894, 167). Col. C. T. Bingham has specimens from Shillong, Assam. The British Museum possess a specimen taken in Bhotan by Mr. G. C. Dudgeon.

Of our illustrations on Plate 564, figs. 2, 2a, male *wet* form from Simla, and 2b, c, a female from the Nilgiris; fig. 2d, e, male and female *types*, the *intermediate* form from Calcutta; figs. 2f, g, male and female *dry* form, from Poona.

INDO-MALAYAN SPECIES.—*Kibreeta Drona* (*Terias Drona*, Horsfield, Catal. Lep. Mus. East India Compy., p. 137, pl. 1, fig. 13, ♂ (1829). Boisduval, Spéc. Gén. Lep. 1, p. 675 (1836). Butler, Ann. Nat. Hist. 1886, p. 214. *Terias Libythea* (pt.), de Nicéville, Journ. As. Soc. Bengal, 1895, p. 494. Butler, Ann. Nat. Hist. 1898, p. 58. *Habitat.* Java, Sumatra.

*Kibreeta Fruhstorferi* (*Terias Libythea*, Fruhstorfer, Deuts. Ent. Zeit. 1902, p. 301; *id.* Soc. Ent. 1903, p. 42. *Habitat.* Tonkin; Annam; Siam.

#### Genus NIRMULA.

*Terias* (part), Boisduval; Doubleday; Butler; Moore.

*Terias* (sect. B), Semper, Reise Phil. Lep. p. 252 (1891). Watson, Journ. Bombay N. H. Soc. 1894, pp. 509, 514.

*Terias* (sect. II. pt.), Butler, Ann. N. H. 1898, p. 63.

Male. *Forewing* subtriangular, somewhat more pointed at the apex than in genus *Kibreeta*. Underside of *forewing* with a large subbasal oval *secondary sexual* patch of compactly-matted salmon-coloured scales, which extend below and partly above the basal portion of the median vein;\* also an ordinary basal elongated appressed patch of glossy-white scales extending above and below basal portion of the submedian vein. *Hindwing* above with a similar salmon-coloured patch of matted scales in the basal interspace of the costal and subcostal vein, the costal border also being glossy-white scaled.

TYPE.—*N. Venata*.

#### NIRMULA VENATA.

Plate 565, figs. 1, 1a, b, ♂ ♀ (*Wet*); 2, 2a, b, ♂ ♀ (*Dry*).

*Terias Venata*, Moore, Catal. Lep. Mus. E. I. Compy., 1, p. 65, pl. 2a, fig. 2 ♂ (1857). Wallace, Trans. Ent. Soc. 1867, p. 320. Chaumette, Ent. Mo. Mag. 1865, p. 37. Swinhoe, Proc. Zool. Soc. 1885, p. 135; *id. l.c.* 1886, p. 430; *id. J. Bombay N. H. Soc.* 1887, p. 275. Doherty,

\* Not below the submedian vein, as stated by Watson, *l.c.* p. 509.

J. As. Soc. Beng. 1886, p. 135. de Nicéville, J. As. Soc. Beng. 1900, p. 252. Mackinnon, J. Bombay N. H. Soc. 1898, p. 588.

*Terias venata* (pt.), Butler, Ann. Nat. Hist. 1898, p. 64.

*Terias vagans* (pt.), Wallace, Proc. Zool. Soc. 1866, p. 357, ♂ (nec ♀).

*Terias Santana*, Felder, Reise Novara, Lep. p. 211 ♂ ♀ (1865).

*Terias Pallitana*, Moore, Ann. Nat. Hist. 1877, p. 48, ♂ ♀ (Dry form).

*Wet form* (fig. 1, 1a, b ♂ ♀). Male. Upperside pale yellow, basal areas slightly irrorated with grey-black scales. *Forewing* with a broad vinescent-black outer marginal band, which curves from middle of the costa to upper median, below which it is sinuated to lower median, its posterior end being deeply excavated to the angle. *Hindwing* with a distinctly defined black slender complete band; and a salmon-coloured patch of matted scales between the costal and subcostal vein. Underside paler yellow, unmarked, except that a very faint indication of marginal dots and a small upper discocellular streak on both wings, and a dot above the cell and discal transverse streaks on hindwing. *Forewing* with a subbasal oval patch of compactly matted salmon-coloured scales, which extend below and partly above the basal portion of the median vein.

Female. Upperside paler yellow. *Forewing* with the outer band somewhat broader. *Hindwing* with the band broader anteriorly and complete; no costal patch. Underside as in male. No subbasal patch of salmon-coloured scales.

Expanse, ♂ ♀  $1\frac{4}{10}$  to  $1\frac{5}{10}$  inch.

*Dry form* (fig. 2, 2a, b ♂ ♀) = *Pallitana*. Male. Upperside. *Forewing* with the band similar to the Wet form, its posterior end more excavated. Underside with the ordinary markings more apparent.

Female. Upperside. *Forewing* with the posterior end of the band obsolescent. *Hindwing* with the band posteriorly narrower and more or less broken. Underside as in the male.

Expanse, ♂  $1\frac{2}{10}$  to  $1\frac{4}{10}$ , ♀  $1\frac{4}{10}$  inch.

HABITAT.—Western Himalayas; Western and Central India.

LIFE HISTORY. *Larva*. “*After first moult*. One-fourth of an inch long; colour grass-green, with a pale yellowish lateral line; surface thickly covered with transverse bands of longish green pyramidal ciliæ; abdomen green; prolegs green; thoracic and anal legs green; head green, covered with black raised spots; stigmatae yellow and shining. *After last moult*. Three-fourths of an inch long; cylindrical and rough; colour and general description same as at first moult. Habits slow. Feeds on the oval-leaved *Cassia* (C. Tora). *Pupa*. Changed into chrysalis October 7th, 1860. Succinctæ; darkish green; rather more than one-third of an inch long, pointed at each end; back very swollen; segments slightly marked with yellow stripes transversely, and black dots here and there; dorsal line dark green and well

defined. IMAGO.—Came out on October 14th, 1860. *Habits.* Continually flying about the clumps of *Cassia Tora*. Flight as in other *Terias*. On the wing in Lucknow, Oudh, the whole year. Common." (Capt. H. L. Chaumette, MS. Notes.)

DISTRIBUTION.—We possess specimens from Kawi Valley, Kashmir, taken by the late W. S. Atkinson; Kausali, W. Himalaya; Manpuri, Punjab, taken by the late C. Horne; Kutch; Bombay; and Mhow, Central India. In Mr. J. H. Leech's Collection are specimens taken at Rajaori, S. Kashmir, 4,000 feet elevation, in September. Mr. P. W. Mackinnon obtained it at "Masuri" (J. Bombay N. H. S. 1898, 588). Mr. W. Doherty obtained it at "Bagheswar, Askot, from 3,000 to 5,000 feet elevation, Eastern Kumaon" (J. A. S. Beng. 1886, 135). Dr. Felder's types of *Santana*, which we have recently verified, and now in Mr. W. Rothschild's Collection, were taken at Kaladungi, at the foot of the Kumaon Hills. Capt. Chaumette obtained it and reared the larva in Lucknow, Oudh (Ent. Mo. Mag. 1865, 37). Col. C. Swinhoe took it in "Karachi, in July, 1886" (J. Bombay N. H. S. 1887, 275); also at "Poona in June and September, Ahmednuggur in the same months, and in Bombay from July to October" (P. Z. S. 1885, 135), and in "Mhow, C. India, from June to October" (id. 1886, 430). Col. C. T. Bingham has specimens from Jabalpur, C. India. Mr. L. de Nicéville records specimens "taken in Karwar, North Kanara District, in October" (J. A. S. Beng. 1900, 252).

The *type* specimen of *venata*, and also that of the male described by Mr. Wallace as that sex of his Formosan species, *vagans*, are in the British Museum Collection.

Of our illustrations on Plate 565, figs. 1, 1a, male of *Wet* form from Western Himalaya, and 1b, the female from Bombay; figs. 2, 2a, b, male and female *Dry* form (*Pallitana* types) from Kutch.

#### NIRMULA RAMA.

Plate 565, figs. 3, 3a, b ♂ ♀ (*Wet*); 3c, d, ♂ ♀ (*Dry*).

*Terias Rama*, Moore, Proc. Zool. Soc. 1872, p. 566, ♀ *id.* Lep. of Ceylon, i. p. 121, pl. 46, fig. 5, 5a, ♂ ♀ (1881)—*Dry*.

*Terias Cingala*, Moore, Ann. Nat. Hist. 1877, p. 48; *id.* Lep. of Ceylon, i. p. 120, pl. 46, fig. 4, 4a, ♂ ♀—*Wet*.

*Terias venata et Rama*, Hampson, J. As. Soc. Bengal, 1888, p. 361.

*Terias venata*, Watson, J. As. Soc. Bengal, 1890, p. 267. de Nicéville, J. As. Soc. Bengal, 1899, p. 211.

*Wet form* (fig. 3, 3a, b, ♂ ♀). Male. Upperside yellow. *Forewing* with a broader black outer marginal band than in *Venata*. *Hindwing* with a similar narrow outer band, and a costal patch of pale salmon-coloured scales. Underside paler

yellow. *Forewing* with a lower basal patch of pale salmon-coloured scales; also a faintly defined discocellular mark. *Hindwing* with two very faintly indicated transverse discal sinuous dusky squamous streaks, and a discocellular mark.

Female. Upperside paler and duller coloured, the basal areas irrorated with minute dark scales. *Forewing* with the outer band similar, but more distinctly dentated posteriorly, on its inner edge. *Hindwing* with the outer band much broader anteriorly than in male. Underside with similar indistinct ordinary markings on the hindwing as in male.

Expanse, ♂  $1\frac{4}{10}$  to  $1\frac{6}{10}$ ; ♀  $2\frac{5}{10}$  inch.

*Dry form* (fig. 3c, d, ♂ ♀). Male. Upperside. *Forewing* with the outer band more distinctly dentated than in *Wet*. *Hindwing* with the outer band somewhat narrower; salmon-coloured patch similar to *Wet*. Underside. *Forewing* with similar salmon-coloured patch as in *Wet*, and hindwing with more distinct transverse discal sinuous streaks.

Female. Upperside. *Forewing* with the band sharply dentated and broken at its posterior end. *Hindwing* with the band comparatively narrower than in *Wet* form, and incomplete posteriorly. Underside with the transverse streaks on hindwing, as in male, distinct.

Expanse, ♂  $1\frac{6}{10}$ , ♀  $1\frac{4}{10}$  to  $1\frac{6}{10}$  inch.

HABITAT.—Ceylon; S. India.

DISTRIBUTION.—In Ceylon, Capt. Hutchison records it from the “Central Province Hills, 3,000 feet, in grass land and forest. Taken on the road to Rambodde, where they were in numbers by the roadside, and apparently at all seasons. Gregarious. Easily captured. Mr. F. M. Mackwood obtained it in the neighbourhood of Kandy” (Lep. Ceyl. i. 121). Dr. N. Manders obtained it “common in open country between 2,000 and 3,000 feet elevation” (J. A. S. Beng. 1899, 211). Mr. G. F. Hampson obtained it in the “Nilgiris! (l.c. 1888, 361). We possess the Ceylon type specimens, and also both sexes from the Nilgiris, and Trevandrum in Travancore. Capt. E. Y. Watson obtained it in Madras in July” (l.c. 267).

Of our illustrations on Plate 565, figs. 3, 3a, b, male and female of *Cingala*, the *Wet* form, and figs. 3c, d of the *Dry* form, *Rama*.

#### NIRMULA SIKKIMA.

Plate 565, fig. 4, 4a, b, ♂ ♀.

*Terias venata*, Elwes, Tr. Ent. Soc. 1888, p. 414.

*Terias Rama*, de Nicéville, Sikkim Gaz. 1894, p. 167.

Male. Upperside. *Forewing* with an outer black band similar to that in male

*Dry* form of *Rama*, except that the posterior end is more widely broken. *Hindwing* with the band also similar, but comparatively broader. Underside with very faintly-defined ordinary markings. Female. Upperside. *Forewing* with the outer band posteriorly narrower than in *Rama*. *Hindwing* with the band also narrower. Underside similar to male.

Expanse, ♂  $1\frac{6}{10}$ , ♀  $1\frac{4}{10}$  inch.

HABITAT.—Sikkim; Bhotan.

Described from specimens in our possession, taken by G. C. Dudgeon.

Mr. H. J. Elwes records it as being “found in Sikkim locally, from 6,000 to 9,000 feet elevation” (*l.c.* 414).

#### NIRMULA PSEUDOLÆTA.

Plate 566, fig. 1j, k, l, m, ♂.

*Terias Rama*, Moore, Journ. Linn. Soc. Zool. 1886, p. 45.

Male. Upperside. *Forewing* comparatively less acuminate at the apex than in *Læta*, the outer band somewhat broader, terminating posteriorly similar to that in male *Rama*, not abruptly at the lower median, as occurs in all males of *Læta*. *Hindwing* with a marginal decreasing, slender, almost continuous slightly-dentated line, which in *Læta* is always macular. Underside paler yellow than in *Wet Læta*. Both wings similarly flecked with pale reddish-ochreous scales, which are less numerous and indistinct.

Expanse, ♂  $1\frac{6}{10}$  inch.

HABITAT.—Mergui, Lower Tenasserim.

Described from specimens in our Collection, taken by Dr. J. Anderson in Mergui, December and March, and Pataw Island, in March.

This species is quite distinct from specimens of typical *Læta* (which we have examined) taken by Col. C. H. E. Adamson in Upper and Lower Burma.

#### NIRMULA LÆTA.

Plate 566, figs. 1, 1a, b, c, d, e, f, g, h, i, ♂ ♀.

*Terias Læta*, Boisduval, Spec. Gén. Lép. i. p. 674 ♂ ♀ (1836). Doubleday, Gen. D. Lep. p. 79 (1847). Moore, Catal. Lep. Mus. E. Ind. Compt. i. p. 65 (1857). Lang, Ent. Mo. Mag. 1864, p. 104. Chaumette, *id. l.c.* 1865, p. 37. Moore, P. Z. S. 1865, p. 493. Wallace, Tr. Ent. Soc. 1867, p. 320. Moore, P. Z. S. 1878, 836. Swinhoe, P. Z. S. 1884, p. 507; *id. l.c.* 1885, p. 135; *id.* 1886, p. 429; *id. J. Bombay N. H. Soc.* 1887, p. 274; *id. Tr. Ent. Soc.* 1893, p. 307. de Nicéville, Journ. As. Soc. Bengal, 1885, p. 50. Butler, Ann. Nat. Hist. 1888, p. 199. Taylor, Butt. of Orissa, p. 13 (1888). Ferguson, J. Bombay N. H. Soc. 1891, p. 443. Doherty, J. As. Soc. Beng. 1886, p. 135. Hampson, J. As. Soc. Beng. 1888, p. 361. Elwes,

Tr. Ent. Soc. 1888, p. 413. de Nicéville, Sikk. Gaz. 1894, p. 167. Watson, J. Bombay N. H. Soc. 1894, p. 514; *id. l.c.* 1891, p. 51; *id. 1897*, p. 669. Davidson and Aitken, J. Bombay N. H. Soc. 1896, p. 571. Adamson, List Burma Butt. p. 42 (1897). Mackinnon, *id. 1898*, p. 588.

*Terias Jaegeri*, Ménétriés, Catal. Mus. Imp. Acad. Sci. Petrop. i. Lep. p. 84, pl. 2, fig. 1, ♂ (1855).

*Wet form* (figs. 1, 1a, b, c, d, e, f, ♂ ♀). Male. Upperside clear pale yellow. *Forewing* acuminated at the apex; cilia yellowish-ochreous; with a broad black apical marginal band curving dentately outward from middle of the costa and terminating abruptly at the lower median veinlet, below which it is continued by a more or less apparent slender thread, to the posterior angle. *Hindwing* with a marginal series of small black dentate spots, the upper two largest and conjoined, the lower minute and indicated as vein tips. Underside. *Forewing* with the ground-colour pale yellow, the cell and inner discal area being clear yellow, the posterior area from the base being glossy-white, and with a salmon-coloured patch of scales below middle of the cell; the costal and outer marginal area numerously flecked with minute reddish-ochreous striæ, some of which form a more or less slightly apparent slender subapical fascia; a slightly apparent blackish-scaled upper discocellular mark is also present. *Hindwing* with the ground-colour pale yellow, and numerously covered with minute reddish-ochreous striæ, those on the disc being most numerously packed, and there form transverse sinuous fasciæ; a slightly apparent blackish-scaled upper discocellular spot and a dot (sometimes two) above the cell, are also present.

Female. Upperside paler yellow. *Forewing* with the outward band as in male. *Hindwing* with the two upper marginal spots larger, the lower vein-tips minute. Underside similar to the male, the striæ on both wings less apparent.

Expanse, ♂ 1  $\frac{6}{10}$  to 1  $\frac{8}{10}$ ; ♀ 1  $\frac{6}{10}$  inch.

*Dry form* (figs. 1g, h, i, ♂ ♀). Male. Upperside. *Forewing* similar to Wet form. *Hindwing* with the upper marginal spots smaller. Underside. Both wings with the reddish-ochreous striæ less prominent than in male Wet form.

Female. Upperside and underside similar to same sex of Wet form.

Expanse, ♂ 1  $\frac{4}{10}$ , ♀ 1  $\frac{6}{10}$  inch.

**HABITAT.**—Western and Eastern Himalayas; Upper and Lower India; Assam; Burma.

**DISTRIBUTION.**—We possess it from Kashmir, taken by Capt. Bayne Reed. In Mr. J. H. Leech's Collection are both sexes, taken at Rajaori, S. Kashmir, in September. Capt. A. M. Lang obtained it at "Kasauli, Western Himalaya; and at Umballa, where it seems to occur nearly all the year round. It has a very weak flight, amongst low herbage, on the skirts of woods and gardens" (Ent. Mo. Mag. 1864, 104). Mr. P. W. Mackinnon took it in Masuri, and the dry season form

in the Dun, where it is extremely common in November and December" (J. Bombay N. H. S. 1898, 588). We possess it from Chuttar, N.W. India, taken by Col. J. W. Yerbury in October. Mr. W. Doherty records it from "Askot, Gori, and Kali Valleys, up to Dharchula, 2,000 to 5,000 feet elevation, in Eastern Kumaon" (J. A. S. Beng. 1886, 135). We possess specimens from Kutch, S.W. Punjab, taken by Mr. G. H. Wilkinson. Col. C. Swinhoe records "one specimen taken at Karachi in June, 1879" (P. Z. S. 1884, 507); also taken at "Poona from October to June; Ahmednuggur, September, October, November, and Bombay July, October, November, and December" (P. Z. S. 1885, 135); "in Mhow, C. India, it is the commonest butterfly; September to July" (id. l.c. 1886, 429); Messrs. Davidson and Aitken note that "this species is not nearly so common in Kanara as in other parts of the Bombay Presidency, but occurs at the northern end of the district" (J. Bombay N. H. S. 1896, 571). Mr. G. F. Hampson obtained it in the Nilgiris (J. A. S. Beng. 1888, 413). We possess a specimen from the Shevaroy Hills, taken by Dr. Short. Mr. H. S. Ferguson records it from "Pirmerd, Travancore" (J. Bombay N. H. S. 1891, 443). Mr. W. C. Taylor found it "common at Khorda, in Orissa" (List, p. 13). In the late W. S. Atkinson's Collection were specimens taken on Parasnath Hill, Lower Bengal. Mr. L. de Nicéville records "a single specimen taken in the neighbourhood of Calcutta" (J. A. S. Beng. 1885, 50). Col. C. Swinhoe has received specimens from the "Khasia Hills" (Tr. Ent. Soc. 1893, 307). Mr. H. J. Elwes writes, "this species occurs in Sikkim, but not abundantly, at from 7,000 to 9,600 feet elevation in July, August, and September" (Tr. Ent. Soc. 1888, 413). Col. C. H. E. Adamson obtained specimens, which we have verified, and who records it as "not uncommon about Bhamo, Upper Burma, in October, but scarce in Moulmein, Lower Burmah, in March" (List, 1897, 42). Capt. E. Y. Watson obtained specimens, during the Chin-Lushai Expedition of 1889-90, on the road "from Pauk to Tilin, in November, also at Tilin in December and April" (J. Bombay N. H. Soc. 1891, 51). Mr. O. Limborg obtained it on the road from "Moulmein to Meetan, Upper Tenasserim" (P. Z. S. 1878, 836).

Of our illustrations on Plate 566, figs. 1, 1a, are from a N. Indian male, and 1b, c, from a Travancore female, and figs. 1d, e, f, from a Karachi male and female of the *wet* season form; figs. 1g, h, i, from a Kutch male and female of the *Dry* form.

#### INDO-MALAYAN, CHINA, AND JAPAN SPECIES.

*Nirmula Senna* (Terias Senna, Felder, Reise Novara, Lep. ii. p. 212, ♂ (1865).  
Habitat. Malacca.

*Nirmula Anamica* (Terias Læta, Fruhstorfer, Deuts. Ent. Zeit. 1902, p. 302; id. Soc. Ent. 1903, p. 42. ?Terias Læta, Walker, Tr. Ent. Soc. 1895, p. 465.

? *T. subfervens*, de Nicéville, J. A. S. Beng. 1902, p. 26. *Habitat.* Annam; Siam; ? Hongkong.

*Nirmula Hainana* (*Terias Hainana*, Moore, Proc. Zool. Soc. 1878, p. 700. *Habitat.* Hainan).

*Nirmula vagans* (*Terias Vagans*, Wallace, Proc. Zool. Soc. 1866, p. 357; *id.* Trans. Ent. Soc. 1867, p. 321, ♀ (*nec ♂*). *Habitat.* Formosa.

*Nirmula subfervens* (*Terias subfervens*, Butler, Ann. Nat. Hist. 1883, p. 278; *id. l.c.* 1898, p. 65. *T. Læta*, De Lorza, Lep. Japon. p. 18 (1869). *Pryer*, Lep. Niphon, p. 10, pl. 2, fig. 10 (1886); *id. Ent. Mo. Mag.* 1888, p. 185. *Leech*, Butt. China and Japan, p. 426. *Habitat.* Corea; Japan.

*Nirmula Betheseba* (*Terias Betheseba*, Janson, Cistula Entom. i. p. 272 (1878). *Butler*, Ann. Nat. Hist. 1898, p. 63. *Pryer*, Lep. Niphon, p. 10, pl. 2, fig. 11 (1886); *id. Ent. Mo. Mag.* 1888, p. 185. *Leech*, *l.c.* p. 426. *Habitat.* Japan.

*Nirmula Semperi* (*Terias Venata*, Semper, Reise Phil. Lep. ii. p. 252, pl. 41, figs. 1, 2, ♂ ♀ (1891). *Habitat.* Luzon.

#### Genus TERIAS.

*Terias*, Swainson, Zool. Illust. 1st Ser. *text to* pl. 22 (1820-21). Horsfield, Catal. Lep. Mus. E. I. Compy. p. 134 (1829). Boisduval, Spéc. Gen. Lép. p. 651 (1836). Doubleday, Gen. D. Lep. p. 76 (1847). Butler, Cist. Ent. i. pp. 35, 44 (1870). Scudder, Proc. Amer. Acad. A. et Sci. 1875, p. 278. Moore, Lep. of Ceylon, i. p. 118 (1881). de Nicéville, Journ. As. Soc. Bengal, 1885, p. 49. Distant, Rhop. Malayana, p. 302 (1885). *Leech*, Butt. of China, &c., ii. p. 425 (1893). *Kirby*, Allen's Nat. Libr. Lep. ii. p. 232 (1896).

*Terias* (sect. 3), Semper, Reise Phil. Lep. p. 253 (1891). *Butler*, Ann. Nat. Hist. 1898, p. 66.

*Eurema* (part), Hübner, Verz. bek. Schmett. p. 96 (1816). Staudinger, Exot. Schmett. i. p. 27 (1882), *id. ii.* p. 66 (1892).

**IMAGO.**—*Forewing* subtriangular, apex obtuse, costa much arched from the base, exterior margin very slightly oblique, posterior margin recurved; costal vein extending to beyond half the margin; first subcostal branch rising at less than one-third before, and second, close to end of the cell, third, fourth, and fifth, beyond the cell; upper discocellular erect, lower bent outward, the radial from end of their angle; cell broad, extending to fully half the wing; middle median branch at one-third before lower end of the cell; submedian vein much recurved. *Hindwing* broadly obovate, the exterior margin medially somewhat angularly produced in both *Wet* and *Dry* form; precostal vein almost atrophied; costal vein much arched from the base; subcostal straight to end of the cell, its first branch emitted close to end of the cell, and much curved upward; upper discocellular shortest, lower outwardly

oblique, and very concave, radial from their angle; lower median branch at half before end of the cell; submedian vein straight; internal vein recurved. Body slender; thorax hairy; palpi short, scarcely extending beyond the head; flat, squamose, third joint minute and pointed; legs slender, tarsi long; antennæ short, club moderately stout.

Male. Underside of forewing, in both *Wet* and *Dry* forms, with a *secondary sexual* narrow linear depressed streak of pale violet glandular scales—extending along each side of basal portion of the median vein\* to near the lower branch,—these streaks having an opaque appearance on holding the wing up to the light; the posterior basal area of the wing is also clothed with appressed glossy-white scales.

LARVA.—“Cylindrical. Colour green, with a white line along each side shading into the green of the back. Head green; fine rugæ across the back set with short hairs. Feeds on *Cassia*.”

PUPA.—“Suspended by posterior end and a thread at the middle; single pointed at both ends, the back, which is placed upwards, is gibbous; a sharp ridge runs along each side. Imago emerges in about eight days” (Dr. A. Leith, Bombay).

TYPE.—*T. Hecabe*.

This is a most difficult and puzzling genus of butterflies to study, from the fact that the species, having several broods during the year, and these broods, where occurring in areas—in which the seasonal and climatic changes are more or less well-marked—show certain *distinctive features* in their markings, these features being different, and recognizable, if carefully compared *inter-se* with those of the brood of the co-ordinate form of other localities.

The species of the genus, within our limits, occur in the Hills and Plains, North and South, and the different climatic and atmospheric conditions, of these areas, have great influence upon the production of the various patterns of the markings in the broods produced during the year, especially in those areas where the climate is very wet, moderately wet, or extremely dry. The dominant species, and also the most widely distributed, is *Hecabe*, this species, in a *Wet* and *Dry* form only, occurring both in our Northern and Southern areas. A characteristically noticeable feature, in all the species, is that of the numbers of the *cell-marks* on the underside of the forewing, in both sexes—as shown below:—

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\* These two *secondary sexual* brands, as above described, are present in the *males* of all the species of true *Terias*, and were first correctly noticed by Mr. L. de Nicéville, in *Journ. As. Soc. Bengal*, 1885, p. 49; and erroneously stated as being present on the *submedian* vein, by Capt. E. Y. Watson, in *Journ. Bombay Nat. Hist. Soc.* 1894, p. 508.

TABLE SHOWING THE NUMBER OF CELL-MARKS.

NAME OF SPECIES.					NUMBER OF MARKS.
Hecabe	...	...	...	...	Two.
excavata	...	...	...	...	Ditto.
Purnea	...	...	...	...	Ditto.
fimbriata	...	...	...	...	Ditto.
Swinhoei	...	...	...	...	Ditto.
Asphodelus	...	...	...	...	Ditto.
Æsiopeoides	...	...	...	...	Ditto.
Davidsoni	...	...	...	...	Three.
Citrina	...	...	...	...	Ditto.
rotundalis	...	...	...	...	Ditto.
uniformis	...	...	...	...	Ditto.
grandis	...	...	...	...	Ditto.
Silhetana	...	...	...	...	Ditto.
Kana	...	...	...	...	Two.
Andersoni	...	...	...	...	Ditto.
Merguiana	...	...	...	...	Three (basal sometimes absent in <i>male</i> ).
fraterna	...	...	...	...	Two (Three in <i>Extra Dry</i> form).
patruelis	...	...	...	...	Two.
Nicobariensis	...	...	...	...	Ditto.
Rœpstorffii	...	...	...	...	Three.
Cadellii	...	...	...	...	Ditto.
Andamana	...	...	...	...	One (In <i>Wet</i> , <i>Dry</i> , and <i>Extra Dry</i> ).
Blainii	...	...	...	...	Two.
Moorei	...	...	...	...	Three.

*Arrangement of the Species.*—With the exception of *Hecabe*, which has a range of distribution throughout our limits, we have arranged the various described species in geographically local-groups, with the view of thus more clearly indicating the representative, or co-ordinate, species occurring in each of the various areas where the genus is found.

*Species locally restricted.*—As a result of careful and critical comparison of numerous specimens of the various named species, we find that they are of restricted habitat, and topomorphic representative species, each species also producing the *seasonal forms* with modified pattern of the markings on the upperside, this pattern, in the different forms of those of the species as occur in its *area of habitat*, are found to be perceptibly different, on careful examination and comparison with the co-ordinate forms of other areas—each successive or seasonal form producing the distinctive feature or local difference observable. These differences in the shape of

the band as occur in the *Wet*, *Dry* and *Extra-Dry* forms are therefore *endemic*, occurring only in those produced in the same area, and are consequently distinct local species.

Some specimens are found with a very slightly defined *subapical* patch on the underside of the forewing, this being an indication of a brood, or an emergence *intermediate* between the end of the *Wet season* and the commencement of the *Dry*. Other specimens also occur, indicating a brood, or an emergence between the period of the *Ordinary Dry* and the *Extreme-Dry* season.

In the N.W. Himalayas and drier areas of Western India—especially in the Punjab Plains and its desert tracks, we note the absence or paucity of specimens of the *Wet* form, in comparison to the large number of the *Dry* form, occurring in the following locally restricted species, viz., *Purreea*, *excavata*, *fimbriata*, *irregularis*, *apicalis*, *Æsiopeoides*, *Swinhoei*, *Asphodelus* and *Narcissus*.

Of these various allied local species that have been described—the type specimens of most of which are in our own Collection, or, we have personally compared the originals—those species of the Northern, or drier areas, also produce the *Wet* and *Dry* form only, whereas, in the more Southern and South Eastern areas, where the seasons are more prominently defined, a characteristically-marked *Extreme Dry* form is also produced.

#### TERIAS HECABE.

Plate 567, figs. 1, a—i, ♂ ♀; fig. 2 ♂, ab. var.

*Papilio Hecabe*, Linnaeus, Syst. Nat. ed. X, p. 470—*excl. ref. Petiver*\* (1758) Edwards, Glean. Nat. Hist. i. pl. 253 (1758). Linn. Mus. Lud. Ulr. p. 249 (1864), *id. Syst. Nat. ed. XII.* p. 763 (1767). Fabricius, Syst. Ent. p. 472 (1775). Sulzer, Gesch. Ins. p. 143, pl. 15, fig. 7 (1776). ? Cramer, Pap. Exot. ii. p. 40, pl. 124, fig. B. C. (1777). Fabr. Spec. Ins. ii. p. 42 (1781). Herbst, Nat. Schmett. v. p. 171, pl. 106, fig. 3, 4 (1792).

*Eurema Hecabe*, Hübner, Verz. bek. Schmett. p. 96 (1816). Kirby, Catal. D. Lep. p. 448 (1871). Kheil, Rhop. Nias, p. 34 (1884). Aurivillius, Kongl. Svensk. Vet. Akad. Handl. 1882, p. 60.

*Terias Hecabe*, Swainson, Zool. Illustr. i. ser. text, pl. 22 (1820-21).

*Pieris Hecabe*, Godart, Encyc. Méth. ix. p. 184 (1819). Horsfield, Catal. Lep. Mus. E. I. Compy., p. 135, pl. i. fig. 12, iv. fig. 8, 8a, *larva* and *pupa* (1829). Boisduval, Spec. Gen. Lep. i. p. 669 (1836). Doubleday, Gen. D. Lep. i. p. 79 (1846). Moore, Catal. Lep. Mus. E. I. Compy. i. p. 63, pl. 1, fig. 11, 11a, *larva* and *pupa* (1857). Lang, Ent. Mo. Mag. 1864, p. 104; *id. Proc. Zool. Soc.* 1865, p. 492. Butler, Catal. Fabr. Lep. Brit. Mus. p. 227 (1869). Kirby, Trans. Ent. Soc. 1870, p. 14. Moore, Proc. Zool. Soc. 1878, p. 836; *id. Lep. of Ceylon*, p. 118, pl. 45, fig. 1, 1a, b, c, ♂ ♀ *larva* and *pupa* (1881); *id. P. Z. S.* 1882, p. 252; *id. l.c.* 1886, p. 45. Butler, Proc. Z. S. 1883, p. 150; *id. l.c.* 1886, p. 372; *id. Ann. Nat. Hist.* 1868, p. 220, *id. l.c.* 1898, p. 69. Distant, Rhop. Malay. p. 304, pl. 26, fig. 19, ♂ (*Wet*) ♀ figs. 11, 15 (*Dry*) (1885). Doherty, Journ. As. Soc. Bengal, 1886, p. 135. Swinhoe, P. Z. S. 1894, p. 507; *id. l.c.* 1885, p. 136, *id. 1886*, p. 430; *id. Ann. Nat. Hist.* 1887, p. 274; *id. Tr. Ent. Soc.*

\* See Philippine species; *poste*.

1891, p. 308. de Nicéville, J. As. Soc. Beng. 1885, p. 49; *id. l.c.* 1899, p. 212. Hampson, J. As. Soc. Beng. 1888, p. 361. Elwes, Tr. Ent. Soc. 1888, p. 412; *id. J. As. Soc. Beng.* 1887, p. 430. Taylor, List Orissa Butt. p. 13 (1888). Watson, J. Bombay N. H. Soc. 1890, p. 7. Ferguson, J. Bombay N. H. S. 1891, p. 13. Davidson and Aitken, J. Bombay N. H. Soc. 1890, p. 359; *id. l.c.* 1896, p. 570, pl. vi. fig. 5, 6, *larea* and *pupa*. Snellen, Mid. Sumatra Lep. p. 23, pl. 1, figs. 6, 7 (1892). de Nicéville, Sikkim Gaz. 1894, p. 167; *id. Walker*, Trans. Ent. Soc. 1895, p. 464. J. As. S. Beng. 1895, p. 497; *id.* 1899, p. 212. Adamson, List Burma Butt. p. 42 (1897). Mackinon and de Nicéville, J. Bombay N. H. S. 1898, p. 586. Frühstorfer, Deuts. Ent. Zeit. 1902, p. 302. de Nicéville, J. As. S. Beng. 1902, p. 26.

*Terias Hecabeoides*, Menetries, Catal. Mus. Petrop. Lep. i. p. 85, pl. 2, fig. 2, ♂ (1855)—*Wet form*. Butler, Trans. Linn. Soc. Zool. 1879, p. 550. Swinhoe, Proc. Zool. Soc. 1884, p. 508; *id. l.c.* 1885, p. 136; 1886, p. 430; *id. J. Bombay N. H. Soc.* 1887, p. 274. Moore, Lep. of Ceylon, i. p. 119, pl. 45, fig. 3, 3a, b, ♂ ♀ (1881)—*Wet*.

*Terias simula*, Moore, Lep. of Ceylon, i. p. 119, pl. 45, fig. 2, 2a, b, ♂ ♀ (1881)—*Dry form*.

*Terias contubernalis*, Moore, Journ. Linn. Soc. Zool. 1886, p. 46, ♂ ♀—*Dry form*.

*Terias curiosa*, Swinhoe, Proc. Zool. Soc. 1884, p. 508, pl. 4, fig. 3, ♂ *id. J. Bombay N. H. Soc.* 1887, p. 275—(*alberr. var.*).

*Terias Lacteola*, Distant, Rhop. Malay, p. 466, *woodcut*, fig. 123, ♀ (*alb. var.*).

*Terias Suara* (pt.), Butler, Ann. Nat. Hist. 1898, p. 69—*nec Boisduval*.

*Wet form* (fig. 1, 1a, b, c, d, e, ♂ ♀). Upperside. Both wings chrome-yellow, palest in recently-captured specimens; cilia yellowish-white. *Forewing* with the costal edge at the base, irrorated with greyish-black scales, thence extending in a black line to the first subcostal branch, where it joins a broad outer-marginal black band, the inner-edge of this band curving dentately outward from the subcostal to middle of the upper median branch—where it is prominently angled, the medial portion of the band below the angle being incised to half its width, and dentate at the middle median branch, the lower portion of the band becoming wide and is sharply angled at the lower median, below this latter veinlet its inner-edge is even and inclined more or less inward. *Hindwing* with a marginal black band of moderately broad but varying width, its inner-edge being slenderly dentate at the veins. Underside sulphur-yellow. *Forewing* with an indistinctly-defined grey-black slender-lined discocellular mark, two cell marks, namely, a zigzag mark in middle, and a subbasal dot; there is also a point at tip of the anterior veins; the *sexual brand* on both sides of the basal portion of the median vein being visibly opaque on holding the specimen up to the light. *Hindwing* with a similar discocellular mark, a ringleted-mark in middle of the cell, a small circlet above the cell near the base, and another below the cell, a discal zigzag series of squamous marks, and also a minute dot at the vein tips.

Female. Upperside paler yellow than in male. *Forewing* with the black outer marginal band slightly broader than in male, its upper inner-edge generally less curved and dentated above the median angle. *Hindwing* with the outer marginal

band broader, but less distinctly defined than in male. Underside. Ordinary markings similar to the male.

Expanse, ♂  $1\frac{6}{10}$  to  $2\frac{2}{10}$ ; ♀  $1\frac{2}{10}$  to  $2\frac{1}{10}$  inches.

*Dry form* (fig. 1, f, g, h, i, ♂ ♀). Male. Upperside similar to the Wet form. *Forewing* with the marginal black band slightly shorter at the lower end. *Hindwing* with the band narrower than in Wet form. Underside. Both wings with the ordinary markings more distinct, and the discocellular mark generally broader. *Forewing* with the *sexual brands* as in wet form, and a more or less slightly-defined, or a distinctly formed, brown subapical patch, and in this form, a minute black point is always present at the base of the lower subcostal veinlet.

Female. Upperside. *Forewing* with the marginal band as in female Wet form, but slightly shorter at its lower end. *Hindwing* with the band somewhat narrower. Underside similar to the male.

Expanse, ♂  $1\frac{6}{10}$  to 2, ♀  $1\frac{4}{10}$  to  $2\frac{1}{10}$  inches.

*Aberrant Var.* (fig. 2 = *curiosa*). Male (*Wet form*). Upperside. “*Forewing* with the costa black, a broad black marginal band commencing just outside the middle of the costa, sinuous internally, and filling nearly the whole of the marginal area. *Hindwing* with the black border as in *Hecabeoides*.” Underside. *Forewing* with very slightly-defined apical-marginal dots and two discocellular dots, the two *sexual brands* being also present. *Hindwing* also with marginal dots and a discocellular ringlet.

Expanse,  $1\frac{6}{10}$  inch.

**HABITAT.**—Lower Western, Central, and Eastern Himalayas; throughout Continental India; Ceylon; Burma; Tenasserim; Andamans; Nicobars; Malay Peninsula; Siam; Annam; S.E. China; Sumatra; Borneo; Java.

*Historical Note on the type of Hecabe.*—That Linnæus in *Syst. Nat.* X. ed. p. 470 (1758) described this butterfly from a specimen (presumably) in his own possession, and not from the figure in Petiver—which he there quotes as an illustration of his species, is evidenced by his describing the *underside* of his own specimen, whereas, Petiver figures the *upperside* only. In his “*Mus. Ludov. Ulricæ*,” p. 249 (1764), this species is more fully described, Petiver’s figure being here quoted as *Pap. Luzoniensis*, and Edwards’ figure added as a second illustration. Again, in *Syst. Nat.* XII. ed. p. 763 (1767) the same description is here repeated, the *Mus. Ulricæ* being quoted, and both Petiver’s and Edwards’ figure given as illustrations.

In Clerck’s unpublished “*Icones*,” vol. iii., pl. 6, figs. 4a, b (of which I have a correct tracing obtained from the Stockholm Academy) represent the upper and underside of (probably) the Linnæan specimen.

In Linné’s Cabinet of Insects, at the Linnæan Society of London, there is a

specimen of this butterfly—a male of the *wet* form, labelled “*Hecabe*,” which is stated by the Librarian, Mr. A. W. Kappel, to be in Linné’s *own handwriting*. This specimen, on the upperside of the forewing, has the broad anterior portion of the band angled at the middle of the upper median veinlet, and a broad posterior portion, and also the broad band on the hindwing, this pattern of the bands being the same as in that which we have described and figured, as typical *Hecabe*, in this work.

Petiver’s insect is stated by that author to have come from “Luzon,” and his figure, in “*Gazoph.*” pl. 28, represents the butterfly on the upperside, with the band on forewing as being anteriorly somewhat narrowed (probably from abrasion), and *not angled* at the upper median. This anterior angulation of the band is not represented in Clerck’s drawing, but is well indicated in Edwards’ figure. We have, therefore, rejected Petiver’s figure, as an erroneous identification (by Linné). Petiver’s figure agrees exactly with that given in Semper’s *Reis. Philip. Lep.* pl. 41, fig. 13, which is there given as the male of the Philippine representative of *Hecabe*, and we have therefore assigned it to that local-group of species.

**LARVA.**—“Cylindrical, slightly depressed, long, rugose; head large. Colour green.”

**PUPA** “suspended by the tail and a moderately long band; abdominal segments round, the thorax much compressed; wing-cases uniting to form a sharp keel, the head case terminating in a short pointed snout. Ordinarily the pupa is solitary and green. The favourite food of the larva, in the Kanara District, Bombay, is *Sesbania aculeata*, a Monsoon annual; it also feeds readily on *Cassia Tora*” (Davidson and Aitken, J. Bombay N. H. S. 1890, 359).

**HABITS OF IMAGO; LARVA; PUPA.**—In Sumatra “All species of *Terias* are weak on the wing, fly slowly, and never leave the ground for a high flight. They are all, with the exception of *T. Harina*, found in open places, in gardens, on roads, and near houses, the males frequently assembling in large numbers on wet spots on roads, and by the sides of rivers and streams. *T. Hecabe* sometimes appears in swarms, and its larva may then prove very destructive to *Cassia* plantations. *Cassia florida* is its favourite food-plant, on which the eggs are sometimes deposited singly, as are the eggs of *Catopsilia*, but sometimes on a single leaf a large number are placed in a rhomboid shape. In the latter case the green pilose larva with a yellowish-white lateral streak and a black head live in societies, and the pupa are also suspended sociably, a fact not previously, we believe, observed in Lepidoptera. If the pupa hang from leaves they are green, if near flowers of the *Cassia* they are yellow, and if the caterpillars leave the food-plant and pupate on certain high *Gramineæ* they are blackish-brown like the seed of the grass. As the pupæ are arranged at regular distances apart, the deception is a very good one, and must

greatly protect them, as men, animals, and birds at a superficial glance would take these pupæ to be only withered flowers of the *Cassia*, or ripe seeds of the grass. After six days in the pupa state the imago emerges. Though so weak and slow in flight, they are very clever in avoiding being caught by the net." (Dr. L. Martin, J. As. Soc. Bengal, 1895, 499.)

WET AND DRY FORM ONLY KNOWN.—As a result of our study of the various species of this genus, we find that the typical, or dominant, species—*Hecabe*, is represented by *two forms only*, namely, those of the *Wet* and *Dry* form. These two forms being, *presumably*, each seasonally produced only in alternating climatic areas, or both forms occurring together in the continuously-drier, or arid areas. The pattern and shape of the band on upperside of both wings, in each form, from all our cited areas, being identically the same—this, doubtless, is due to the climatic conditions, in each of the several areas, being the same during the periods of its existence. Whether these two forms of *Hecabe* are each produced alike, in *successive broods only* during the period of the annual local-equivalent of the *Wet* and *Dry* season, or, *both forms* appear together throughout the annual cycle of its existence, cannot at present be determined.

The following is a table showing some interesting facts on the above point, the dates of capture being taken from authentic labels of the captors :—

DATES OF APPEARANCE OF *HECABE*.

LOCALITY.	WET FORM.	DRY FORM.	COLLECTOR.
Rajaori, S. Kashmir ...	September	September	J. H. Leech.
Campbellpur ... ...	June ; Sept. ; Oct. ; Nov.	November	Col. Yerbury.
Thundiani ... ...	September	July ; September	Ditto.
Karachi... ... ...	July ; August	March ; August ; Oct. ; November ; December	Col. Swinhoe.
Belgaum ... ...	October	October	Ditto.
Poona ... ...	July	June	Ditto.
Bombay ... ...	January ; September	Jan. ; July ; Aug. ; Nov.	Ditto.
Ahmednuggur ... ...	—	July ; August ; October	Ditto.
Sattara ... ... ...	September	—	Ditto.
Assam ... ... ...	September	November	Mrs. Span.
Chittagong ... ...	May ; June ; September	—	ex Col. Bingham.
Mergui ... ... ...	December	—	Dr. Anderson.
Rangoon ... ... ...	May ; July ; Aug. ; Sept.	April	—
Pegu ... ... ...	April ; May ; September	—	—

DISTRIBUTION (Within own area).—We possess specimens of the *Wet* and *Dry*-

season form of this species as above described and figured, from the widely spread areas in which it is found; as follows:—*Wet* and *dry* form from Kashmir, taken by Capt. R. Bayne Reed; Simla; Campbellpur, *wet*, June, *dry*, November; Thundiani, *wet* and *dry*, September; Hassan Abdal, *wet*, June; Rawul Pindi, *wet*, September, taken by Col. J. W. Yerbury; Nepal (Genl. G. Ramsay); Darjiling, and Bhotan (Mr. G. C. Dudgeon); Ahmednuggur, *wet* and *dry*, July, October; Karachi, *wet*, June; Bombay, *wet*, June, *dry*, January; Poona, *wet*, June and July; Belgaum, *dry*, August, taken by Col. C. Swinhoe; Nilgiris, *wet* and *dry* (Mr. G. F. Hampson); Madras, *wet*; Ceylon, *wet* and *dry*; Barrackpur, Calcutta, *wet* and *dry* (J. F. Rothney); Assam *wet*; Chittagong, *wet*, June, September; Rangoon, *wet*, August (Col. C. T. Bingham); Burma, *wet* (Col. Adamson); Mergui (Dr. Anderson); Andamans; Nicobars (Mr. F. de Roepstorff); Malacea, *wet*; Nias, *wet*; Sumatra, *wet* and *dry*; Java, *wet* and *dry* (Dr. Horsfield); S. E. China, *wet* and *dry*. Col. C. Swinhoe possesses verified specimens from Karachi, *dry* form taken in January, September, October, and November; Bombay, *dry*, March; Sattara; Belgaum, *wet*, October; Poona, *wet*, July. Col. C. T. Bingham has specimens from Jabulpur, *wet*, September; Nowgong, Assam, *dry*, November; Pegu, *wet*, April and May; Siam and Tonkin.

Capt. A. M. Lang obtained it in the “Simla Hills” (Ent. M. Mag. 1864, 104). Capt. Chaumette “captured it in Oudh” (l.c. 1865, 37). Mr. J. H. Hocking took it at “Dharmasala, Kangra District” (P. Z. S. 1882, 252). Mr. W. Doherty records it as being found “everywhere, in Kumaon, up to 8,000 feet, occasionally higher” (J. A. S. Beng. 1886, 135). “This is the commonest species of the genus in Masuri and the Dehra Dun” (Mr. P. W. Mackinnon, J. Bombay N. H. S. 1898, 586). Col. C. Swinhoe records it from “Karachi, appearing plentifully from April to August” (P. Z. S. 1884, 507). Also “common everywhere in Bombay and the Dekkan from October to May” (id. 1885, 136), and at “Mhow in February, July, September, October, and November” (id. 1886, 430). Col. Swinhoe also obtained one example of the variety *curiosa*, at Karachi in August, 1879 (id. 1884, 508). Mr. G. F. Hampson records it from the “Nilgiris” (J. As. S. Beng. 1888, 361). Capt. E. Y. Watson obtained “numerous specimens in Mysore during November” (J. Bomb. N. H. S. 1890, 7), and records it as “common in Madras in May, June, and July” (J. A. S. Beng. 1890, 267). Dr. N. Manders says it is “abundant everywhere in Ceylon, and occurs at all seasons, the larva feeding on the Madras Thorn” (J. A. S. Beng. 1899, 212). Mr. H. S. Ferguson found it “common in Travancore, S. India, in low country and the Hills” (J. Bombay N. H. S. 1891, 43). Mr. W. C. Taylor says it is “common at Khorda, Orissa” (List, p. 13). Mr. J. Rothney found it “very common in Barrackpur Park, near Calcutta, from March to October, especially during the rains, and is a lover of sunshine” (Ent. M. Mag. 1882, 35). Mr. L. de Nicéville also records it as “common at all seasons in

the neighbourhood of Calcutta" (J. A. S. Beng. 1885, 50). Col. C. Swinhoe has received numerous specimens from the Khasias (Tr. Ent. Soc. 1893, 308). Mr. H. J. Elwes says it is "common in Sikkim, and extends from the Terai to at least 10,000 feet elevation" (Tr. Ent. Soc. 1888, 412). Mr. L. de Nicéville also says it is "common in Sikkim, and flies all the year round at low elevations, it being only stragglers that extend their flight to so great an elevation as 10,000 feet" (Sikkim Gaz. 1894, 167). In Burma, it was obtained by Col. C. H. E. Adamson. Capt. E. Y. Watson obtained it "during the Chin-Lushai Exped. of 1889-90, at Pokoko and Pauk in September, and at Tilin from November to May" (J. Bomb. N. H. S. 1891, 51), and also "in the Chin Hills the dry-season form occurred commonly in April, and the rainy season form in May and June, these were noticed only up to 3,500 feet" (id. l.c. 1897, 669). Mr. O. Limborg obtained it "on the road from Moulmein to Meetan, at Hatseiga, and Paboga, Upper Tenasserim" (P. Z. S. 1878, 836). Dr. J. Anderson obtained it in Mergui, "in December and March" (J. Linn. S. Z. 1886, 46).

Of our illustrations of *T. Hecabe*, on Plate 567, figs. 1, 1a represent a male and female *Wet* form from Simla; 1b, c, male and female *Wet* form from Karachi, 1, d, e, male and female *Wet*, also from Karachi, taken in August; figs. 1, f, g, male and female *Dry* form from Belgaum and Ahmednuggur, both taken in October; figs. 1, h, i, male and female *Dry* form (types of *contubernalis*) from Mergui; fig. 2 is copied from the Karachi figure of *T. curiosa*.

#### TERIAS PURREEA.

Plate 568, figs. 1, 1a, ♂, 1b, ♀ (*Wet*); 2, 2a, b, ♂ ♀ (*Dry*).

*Terias Purreea*, Moore, Proc. Zool. Soc. 1882, p. 252, ♂ (*Dry*). Butler, id. l.c. 1886, p. 371.

*Wet form* (fig. 1, 1a, b, ♂ ♀). Male. Upperside. *Forewing* with the black outer band narrower throughout than in local *Wet* form of *Hecabe*, the lower portion small, and its inner-edge inwardly oblique and indented. *Hindwing* with a slightly-defined slender marginal dentated-line. Underside. Both wings with ordinary marks very indistinctly defined. *Forewing* with two cell-marks.

Female. Upperside paler. *Forewing* with the band similar to the male. *Hindwing* with the marginal line slightly indicated only by the vein tips. Underside as in the male.

Expanse, ♂  $1\frac{6}{10}$  to  $1\frac{8}{10}$ ; ♀  $1\frac{8}{10}$  to 2 inches.

*Dry form* (fig. 2, 2a, ♂, 2b, ♀). Male. Upperside. *Forewing* with the marginal band similar to *Wet* form, except that it is less angular at the upper median, and less indented on its lower inner-edge. *Hindwing* with a slender marginal dentated line. Underside. Both wings with distinctly-defined ordinary marks. *Forewing* with a prominent brown subapical patch, two cell-marks, and also

a minute black point at base of lower subcostal branch, and a slight oblique-spot near posterior angle.

Female. Upperside paler. *Forewing* with the outer band more angled at the upper median than in male, its lower portion similar. *Hindwing* with a very slightly-defined slender marginal line, or only slight tip to the veins. Underside with markings similar to the male.

*Expanse*, ♂  $1\frac{8}{10}$ , ♀  $1\frac{6}{10}$  inch.

**HABITAT.**—Lower Western Himalayas; Upper Punjab.

**DISTRIBUTION.**—The *type* of the male and female (*Dry* form) is in the British Museum Collection. We possess a male *co-type* from Dharmasala, Kangra District, taken by the Rev. J. H. Hocking, a male from Lahej, N.W. Punjab, also a female from Thundiani, taken by Col. J. W. Yerbury; also a female from Gurhwal. Its capture is recorded by Col. Yerbury, at "Attock Bridge, November; Campbellpur, November, and Hassau Abdal, in October" (P. Z. S. 1886, 371).

Of our illustrations on Plate 568, figs. 1, 1a, b, are from a *wet* male and female from Campbellpur; 2, 2a, male *Dry* form, from Gurhwal; 2b, female *Dry* form, from Thundiani, taken by Col. Yerbury in September.

#### TERIAS EXCAVATA.

Plate 568, figs. 3, 3a, ♂; 3b, ♀.

*Terias excavata*, Moore, Proc. Zool. Soc. 1882, p. 252, ♂ ♀ (*Dry* form). Butler, Proc. Zool. Soc. 1886, 372.

*Dry* form. Male. Upperside. *Forewing* with the black marginal band comparatively narrower apically than in male *Dry* local form of *Hecabe*, less angled at upper median, and its lower portion smaller. *Hindwing* with a narrower marginal band. Underside with slightly-defined ordinary marks. *Forewing* with two cell marks, and a slightly-defined subapical patch.

Female. Upperside paler. *Forewing* with the black marginal band more angled at the upper median than in male, the lower portion smaller than in female *Hecabe*, and its inner-edge slightly outwardly-oblique. *Hindwing* with a much narrower marginal band than in female *Hecabe*. Underside. Both wings with the ordinary marks more defined than in male. *Forewing* with a more distinctly-formed brown subapical streak than in male.

*Expanse*, ♂  $1\frac{8}{10}$  inch.

**HABITAT.**—Lower Western Himalayas; Upper Punjab.

**DISTRIBUTION.**—The *type* specimens were taken by the Rev. J. H. Hocking at Dharmasala, in the Kangra District, and are in the British Museum Collection. We possess a female *co-type*, from Kangra, and both sexes from the Lahore District,

North Punjab, also a female from Campbellpur, taken by Col. J. W. Verbury, who records its capture in November.

Of our illustrations on Plate 568, figs. 3, 3a, are from the male and female Lahore specimens, 3b, from the *co-type* female, from Kangra.

#### TERIAS FIMBRIATA.

Plate 568, figs. 4, 4a, ♂ ; 4b, ♀.

*Terias fimbriata*, Wallace, Trans. Ent. Soc. 1867, p. 323, ♂ (*Dry form*).

*Terias Suava* (pt.), Butler, Ann. and Mag. Nat. Hist. 1898, p. 69.

*Dry form*. Male. Upperside clear yellow; cilia yellow. *Forewing* with a black outer marginal band narrower than in male *Dry* form of *Purreea*, its apical portion shorter and angled at the lower subcostal (in *Purreea* the angle is at upper median), below the angle to the next veinlet is an outwardly-oblique cluster of black scales, the marginal band from thence to the posterior angle being very narrow and inwardly dentate at each veinlet. *Hindwing* with a marginal row of very small dentate dots, one at each vein tip. Underside. Both wings indistinctly irrorated with minute blackish scales; tip of the veins with a black dentate dot; ordinary markings distinct, the discocellulars and basal marks being inwardly brown edged. *Forewing* also with a more or less defined sinuous subapical brown streak, a minute black dentate dot at base of the lower subcostal veinlet, and two ordinary cell-marks.

Female. Upperside paler than male. Both wings with similar marginal markings, those of the underside being also very slightly apparent. Underside. Both wings with the markings as in male, but more distinct, the subapical brown streak on the forewing being broader.

Expanse, ♂ 2 $\frac{1}{10}$  to 2 inches.

HABITAT.—Western Himalayas.

DISTRIBUTION.—We possess the male *type* specimen, from Masuri, a male from Kashmir, taken by Capt. H. B. Hellard (who records it in his MS. Notes, as being found during "July, August, and September"). We also have both sexes from Gurhwal.

Of our illustrations on Plate 568, figs. 4, 4a, are from the male *type*, from Masuri; fig. 4b, from a Gurhwal female.

#### TERIAS IRREGULARIS.

Plate 568, fig. 5, 5a, ♂ (*Dry form*).

*Terias irregularis*, Moore, Proc. Zool. Soc. 1882, p. 253, pl. 12, fig. 3, ♂ (*Dry*).

*Wet form.* Female. Upperside pale lemon-yellow. *Forewing* with the marginal band broadly oblique and outwardly-curved from the costa, and somewhat sinuous apically, its lower portion narrow. *Hindwing* with a slightly-defined marginal point at the vein tips. Underside. Both wings with slightly-defined ordinary marks. *Forewing* with two cell-marks.

Expanse, ♀  $1\frac{8}{10}$  inch.

*Dry form* (fig. 5, 5a, ♂). Male. Upperside pale yellow. *Forewing* with the black marginal band broadly oblique and slightly sinuous apically, excavated in the middle, and sinuous at the posterior end. *Hindwing* with a very slender marginal dentated line. Underside with distinct brownish-edged ordinary marks. *Forewing* with a brown subapical patch, and two cell-marks.

Female. Upperside paler. *Forewing* with the marginal band sharper angled, the posterior portion indented on its inner-edge. *Hindwing* similar to male. Underside with very prominent chestnut-brown ordinary marks, and *forewing* with subapical patch.

Expanse, ♂ ♀  $1\frac{7}{10}$  to 2 inches.

HABITAT.—Lower Western Himalayas.

DISTRIBUTION.—The *type* of both sexes, taken by the Rev. J. H. Hocking, in the Kangra District, are in the British Museum. We possess *co-type* males from Dharmasala, also taken by Mr. Hocking; also a female of the *Wet form* from Rawul Pindi, taken in April, and both sexes of the *Dry form* from Rawul Pindi, Campbellpur, November; Khairabad, November; Abbottabad, October, by Col. J. W. Yerbury. Males of the *Dry form* are in Mr. J. H. Leech's Collection, taken at Rajaori, Southern Kashmir, in September.

Of our illustrations on Plate 568, fig. 5, 5a, is from the male *co-type*, from Dharmasala.

#### TERIAS APICALIS.

*Terias apicalis*, Moore, Proc. Zool. Soc. 1882, p. 253, pl. 12, fig. 2, ♂ (*Dry*).

*Terias simplex*, Butler, Ann. and Mag. Nat. Hist. 1886, p. 217, pl. 5, fig. 2, ♀ (*Dry*).

*Dry form.* Male. Upperside pale yellow. *Forewing* with the marginal band apically confined to a narrow costal portion, the lower part from the subcostal veinlet composed of almost-disconnected, very small speckled-spots. *Hindwing* with a marginal row of minute spots. Underside. Both wings with distinct chestnut-brown ordinary marks. *Forewing* with a distinct brown subapical streak, and two cell-marks.

Female. Upperside paler than in male. *Forewing* with the band somewhat broader at the apex, the lower portion similar, but more connected. *Hindwing* as in the male.

Expanse,  $1\frac{4}{10}$  inch.

HABITAT.—Lower Western Himalayas.

DISTRIBUTION.—The *type* specimens, taken by the Rev. J. H. Hocking in the Kangra District, are in the British Museum. We possess a male *co-type* from Dharmasala, taken by Mr. Hocking, and also two males from Gurhwal.

#### TERIAS AESIOPEOIDES.

Plate 569, fig. 1, ♂ (*Wet*) ; 1a, b, ♂ ♀, 1c, d, ♂ ♀ (*Dry*).

*Terias AESIope*, Butler, Proc. Zool. Soc. 1883, p. 150. Swinhoe, l.c. 1884, p. 508; *id.* 1885, p. 136 *id.* 1886, p. 430; *id.* J. Bombay N. H. S. 1887, p. 275. Forsayeth, Trans. Ent. Soc. 1884, p. 385; pl. 14, fig. 1, 1a, *larva* and *pupa*.

*Wet form* (fig. 1). Male. Upperside. *Forewing* with the marginal black band similar to that in local *Wet Hecabe*, except that the lower portion has its inner-edge inclined slightly outward. *Hindwing* with the marginal band much narrower. Underside with similar slightly-defined ordinary marks; two cell-marks in forewing.

Expanse, ♂  $1\frac{8}{10}$  inch.

*Dry form* (figs. 1, a, ♂, 1b, ♀ ; 1c, d, ♂ ♀). Male. Upperside. *Forewing* with the band medially somewhat narrower than in *Wet form*, its lower portion smaller, and inclined more or less slightly inward. *Hindwing* with the band narrower than in *Wet form*, or slightly interrupted. Underside. Both wings with the markings distinctly defined. *Forewing* with a distinctly formed subapical patch.

Female. Upperside. *Forewing* with the band similar to male, its lower portion slightly broader. *Hindwing* with the band more slender, and slightly interrupted. Underside similar to male.

Expanse, ♂ ♀  $1\frac{4}{10}$  to  $1\frac{8}{10}$  inch.

LARVA.—“Vermiform in shape, green, with a lateral white line on each side ; movements regular.”

PUPA.—“Attached by tail and thoracic sling, in horizontal position ; wing-cases keeled, head prolonged into a point. Colour at first green, afterwards turning to a brownish-green. Imagines emerged October 14th.” (Forsayeth).

HABITAT.—Western and Central India.

DISTRIBUTION.—Col. C. Swinhoe records its capture at “Karachi in Western India, in December and January” (l.c. 1884, 508), and in “July and August” (J. Bomb. N. H. Soc. 1887, 275); also at “Mhow, Central India, in October” (P. Z. S. 1886, 430). Col. Swinhoe also records it as being “common everywhere in Bombay and the Dekkan, from October to April” (l.c. 1885, 136). It was also obtained by him at “Mhow in September and October” (l.c. 1883, 150). We possess several males and females of the *Dry* form, taken by Col. Swinhoe, viz. :—

from Karachi, Sept. Nov. ; Mhow, April ; Ahmednuggur, March, November ; Poona, Nov., Dec., January ; Bombay, February, Nov., December ; Depalpura, November.

Dr. R. W. Forsayeth "found the larva, in Mhow, on a Leguminous tree ; the larva being small, and exactly similar in colour to the leaves of the tree, was by no means easy of detection. The butterfly is tolerably common, and generally "flying low over green herbage in gardens and cultivated ground" (l.c. 1884, 385).

Of our illustrations on Plate 569, fig. 1 is of a male *Wet* form taken at Karachi, June, 1887 ; figs. 1, a, b, male and female *Dry* form, taken at Karachi in November ; fig. 1, c, of a male *Dry* form, taken at Ahmednuggur, 1d, a female *Dry* form, taken at Poona in January.

#### TERIAS SWINHOEI.

Plate 569, fig. 2 ♂ (*Wet*) ; 2a, b, ♂ ♀ (*Dry*) ; 2c, ♀ (*Extra Dry*).

*Terias Swinhoei*, Butler, Ann. & Mag. Nat. Hist. 1886, p. 216 (*Dry*).

*Wet form* (fig. 2 ♂). Smaller than *Æsiopeoides*. Upperside. *Forewing* with the black marginal band comparatively narrower, the apical portion also narrower, less angled at the upper median, its lower portion smaller, and inclined obliquely inward. *Hindwing* with the black band narrow, more regular, and distinctly formed. Underside. Both wings with very slightly-defined ordinary marks. *Forewing* with two cell-marks.

Expanse, ♂  $1\frac{2}{10}$  to  $1\frac{4}{10}$  inch.

*Dry form* (fig. 2a, b ♂ ♀). Upperside. *Forewing* with the black band as in male *Wet* form. *Hindwing* with the band more slender. Underside. Both wings with the ordinary marks more defined. *Forewing* with a pale brown slender subapical patch.

Female. Upperside paler than in male. *Forewing* with the black band similar, its lower portion slightly narrower. *Hindwing* with a slightly-defined slender marginal broken thread, and more distinct tip at end of the veins. Underside as in the male.

Expanse, ♂  $1\frac{4}{10}$  to  $1\frac{5}{10}$ , ♀  $1\frac{6}{10}$  inch.

*Extreme Dry form* (fig. 2c, ♀). Male. Upperside. Both wings similar to male of ordinary *Dry* form. Underside with the ordinary marks prominently defined and brownish-edged. *Forewing* with an almost completely-quadratae brown apical patch.

Female. Upperside similar to the same sex, of ordinary *Dry* form, the band on *forewing* having its lower portion slightly more angled at the submedian vein. Underside. Both wings with all the ordinary markings well-defined. *Forewing* with an almost completely-quadratae brown apical patch.

Expanse, ♂ ♀  $1\frac{4}{8}$  inch.

HABITAT.—Western and Central India.

DISTRIBUTION.—The *type* specimens, described by Dr. A. G. Butler, were taken by Col. C. Swinhoe in Bombay and Poona. Colonel Swinhoe possesses a *co-type* of the male *Dry* form from Mhow, taken in Sept., and females taken in Sept. and December; also a male and female from Karachi, both sexes from Ahmednuggur, females taken at Poona in January, February, and December, and a male of the *Wet* form taken at Hoshangabad in October. We possess specimens received from Col. Swinhoe, as follows:—Male *wet* form from Ahmednuggur, male of the *Dry* form from Karachi, taken in March, males from Poona, December; Ahmednuggur, and a female from Mhow, taken in January.

Of our illustrations on Plate 569, fig. 2 is the male *Wet* form, from Hoshangabad, taken in October, 1886; fig. 2a, male *Dry* form, from Poona, 2b, the female, from Mhow, taken in November; 2c, the female of *Extreme Dry* form, from Ahmednuggur.

#### TERIAS ASPHODELUS.

Plate 569, figs. 3, 3a, ♂ ♀ (*Wet*); 3b, ♂ (*Dry*); 3c, ♀ (*Extra Dry*); 4, 4a, ♂ ♀ (*Dry*).

*Terias Asphodelus*, Butler, Proc. Zool. Soc. 1883, p. 151, pl. 21, fig. 13, ♂ (*Dry*). Swinhoe, P. Z. S. 1884, p. 508, *id.* 1885, p. 136; *id.* 1886; p. 430; *id.* J. Bombay N. H. S. 1887, p. 275.

*Terias Narcissus*, Butler, *l. c.* p. 151 (*Dry* var.).

*Wet form* (fig. 3, 3a, ♂ ♀). Male and female. Upperside. *Forewing* with the black band comparatively narrower throughout than in *Wet* form of *Swinhoei*. *Hindwing* with slightly narrower band. Underside with the ordinary markings slightly-defined.

Expanse, ♂  $1\frac{2}{10}$ , ♀  $1\frac{4}{10}$  inch.

*Dry form* (fig. 3b, ♂). Male and female. Upperside. *Forewing* with the band also comparatively narrower than in *Dry* form of *Swinhoei*, its anterior portion more curved, and its lower portion narrow throughout to the posterior angle. *Hindwing* with a very slender marginal line and vein tips, or the tips only indicated. Underside. Both wings with distinctly-defined brown-edged ordinary marks. *Forewing* with two cell-marks and a well-defined brown subapical patch.

Expanse, ♂  $1\frac{2}{10}$  to  $1\frac{6}{10}$ , ♀  $1\frac{4}{10}$  inch.

*Extreme-Dry form* (fig. 3c, ♀). Female. Upperside. *Forewing* with the band similar to the *Dry* male. *Hindwing* with the band slightly more defined. Underside. Both wings with similar distinctly-defined brownish-edged ordinary marks. *Forewing* with a brown almost completely-quadrata apical patch.

Expanse, ♀  $1\frac{6}{10}$  inch.

HABITAT.—Western and Central India.

DISTRIBUTION.—The *type* specimens, in the British Museum Collection, were obtained at “Mhow and Depalpur, in December and February” (*l.c.* 1883, 151). Col. C. Swinhoe records it from “Poona, taken in January, February, March, April, and December, and at Mhow in December and April” (*l.c.* 1885, 136; 1886, 480). In Col. Swinhoe’s Collection is a male of *wet* form from Mahableshwar, taken in May; also *co-types* of *Dry* form, taken at Mhow, in November and February, also males taken at Karachi in February, Poona in January, Ahmednuggur, June and November, and at Alibagh in June. We possess a female of *Wet* form—(locality not stated); males of the *Dry* form, taken at Poona in December, March, and April; Mhow, December, and from Ahmednuggur. Col. Swinhoe obtained it in “Karachi from November to March” (*l.c.* 1887, 275).

Of our illustrations on Plate 569, fig. 3 is the male *Wet* form from Mahableshwar; 3a, the female of *Wet* form; 3b, male *Dry* form, from Poona, 3c, female of *Extreme Dry* form from Ahmednuggur; figs. 4, 4a, male and female, var. *Narcissus*, from Mhow and Poona.

#### TERIAS DAVIDSONII.

Plate 570, figs. 1, 1a, ♂ ♀ (*Wet*), 1b, c, ♂ ♀ (*Intermediate*), d, e, ♂ ♀ (*Dry*), f, g, ♂ ♀ (*Extra-Dry*).

*Terias Silhetana*, Davidson and Aitken, Journ. Bombay Nat. Hist. Soc. 1896, p. 571, pl. 6, fig. 6, 6a, *larva and pupa*. de Nicéville, Journ. As. Soc. Bengal, 1900, p. 252 (*Extra-Dry form*).

*Terias Hecabe* (pt.), Hampson, J. As. Soc. Beng. 1888, p. 361.

*Wet form* (fig. 1, 1a). Both sexes larger than the local *Wet* form of *T. Hecabe*. Male. Upperside. *Forewing* with the broad black outer marginal band having the lower end broader and shorter, more inwardly irregular, and its inner-edge curving outward to the posterior angle. *Hindwing* with a broader black outer-marginal band, excavated on its inner edge. Underside. *Forewing* with the ordinary slightly-defined discocellular mark and three cell-marks. *Hindwing* with slightly-defined ordinary markings.

Female. Upperside. *Forewing* with broader outer-marginal band than in male, its lower inner-edge extending obliquely outward; the discocellular mark of the underside distinctly visible. *Hindwing* with a much broader marginal sinuous-edged band than in *Hecabe*. Underside as in male.

Expanse, ♂ 2, ♀  $2\frac{1}{4}$  inches.

*Intermediate form* (fig. 1b, c.) Male. Upperside. *Forewing* with the black outer band somewhat narrower than in typical *Wet* form, its lower end shorter, and slightly outwardly oblique. *Hindwing* with narrow black marginal band.

Underside with more defined ordinary markings. *Forewing* with a brown subapical streak; two cell-marks *only* visible.

Female. Upperside similar to the *Wet* female, except that the discocellular mark on *forewing* is not visible, and the band on the *hindwing* is much narrower. Underside similar to male, the subapical streak on *forewing* being somewhat broader; three marks within the cell.

Expanse, ♂  $1\frac{8}{10}$ , ♀ 2 inches.

*Dry form* (fig. 1, d, e). Male. Upperside. *Forewing* with the black outer band somewhat broader apically and narrower posteriorly than in the *Intermediate* form, its lower end smaller and inwardly-oblique. *Hindwing* with the band narrower. Underside. *Forewing* with ordinary marks, an incompletely-formed apical patch, and three cell-marks. *Hindwing* with similar ordinary markings.

Female. Upperside paler yellow than in same sex of *Intermediate* form. *Forewing* with the outer band somewhat broader apically, its lower end smaller. *Hindwing* with a narrow marginal band. Underside. *Forewing* with darker ordinary marks, and completely-formed apical patch. *Hindwing* with darker ordinary marks.

Expanse, ♂  $1\frac{8}{10}$ , ♀ 2 inches.

*Extreme Dry form* (fig. 1, f, g). Male. Upperside. *Forewing* with the outer band similar to male ordinary *Dry* form, its posterior end somewhat narrower. *Hindwing* with a slender marginal line. Underside similar to ordinary *Dry* form; the apical patch on *forewing* more completely-formed.

Female. Upperside. *Forewing* with the outer band somewhat narrower posteriorly than in ordinary *Dry* form. *Hindwing* with slender, completely-formed outer band. Underside. Both wings similar to the male.

Expanse, ♂  $1\frac{8}{10}$ , ♀ 2 inches.

HABITAT.—South India.

LARVA AND PUPA.—Messrs. Davidson & Aitken write, “ In describing the larva and pupa of *T. Hecabe* (J. Bombay N. H. S. 1890, p. 360) we said that we had once, in September, got fourteen black pupæ all on one dry twig, and so close to each other that they almost touched. We made no attempt at the time to sort the butterflies, when they emerged, from *T. Hecabe*. We have since discovered, however, that these black pupæ are not to be found on the ordinary food plants of *T. Hecabe*, but on *Wagatea spicata* (N. O. Leguminosæ), and that they result from a gregarious larva with a black head. This leaves no doubt that they belong to a distinct species, and, having compared the butterflies which emerged from a large number of both kinds, we find that those produced from the black-headed larva and black pupa had a large red-coloured patch at the apex of forewing beneath, and bear the three dark streaks or spots in the cell in addition to the reniform spot on the discocellular nervules on the underside of the forewing, by which *Silhetana* is

separated from *Hecabe* by Capt. Watson. We have figured the larva and pupa of the two species. Both species appear to be almost equally common in the N. Kanara District. We have a specimen of *Silhetana* caught in October, in which the ground-colour is pure white instead of yellow, the markings being normal" (J. Bombay N. H. S. 1896, 571).

Mr. L. de Nicéville states that the larva of this species also feeds on "POINCIANA REGIA, N. O. Leguminosæ" (J. A. S. Beng. 1900, 252).

DISTRIBUTION.—Col. C. Swinhoe possesses the *type* specimens of male and female *Wet* form taken at Karwar, Kanara, and a male from Coorg, also a female of the *Intermediate* *Dry* form from Karwar. In our own possession is a male of both the *Wet* and *Dry* form from the Nilgiris, and a male *Dry* form from Travancore; also both sexes of the *Extreme* *Dry* form from the Nilgiris, a male from Travancore, and a female from Madras.

Of our illustrations on Plate 570, figs. 1, 1a are from the *type* male and female *Wet* form from Karwar; 1b from the male *Intermediate* form from the Nilgiris, and 1c from female bred by Mr. Aitken in October; fig. 1d, a male *Dry* form from Travancore, and 1e, a female from the Nilgiris; figs. 1, f, g, the male and female *Extreme* *Dry* form, from the Nilgiris.

#### TERIAS CITRINA.

Plate 571, fig. 1, 1a, b, c, d, ♂ ♀.

*Terias Citrina*, Moore, Lep. of Ceylon, i. p. 119, pl. 45, fig. 4, 4a, ♀ (1881) — *Dry form*.

*Terias Silhetana* (pt.), de Nicéville, J. As. Soc. Beng. 1899, p. 213.

*Wet form* (fig. 1). Male. Upperside lemon-yellow. *Forewing* with the outer marginal black band anteriorly broader than in Ceylon specimens of *Hecabe*, the posterior end shorter and its inner edge outwardly oblique. *Hindwing* with a moderately broad black outer band. Underside. Both wings with more or less defined ordinary markings of *Wet* form. *Forewing* with three marks in the cell, in addition to the discocellular. No subapical patch. Female. Not seen.

Expanse,  $2\frac{2}{10}$  inches.

*Intermediate form* (fig. 1a, ♀). Male. Not seen. Female. Upperside. *Forewing* with similar outer band to the *Wet* form. *Hindwing* with a broad black outer marginal band. Underside with slightly-defined ordinary brown markings as in *Wet* form. *Forewing* with a brown subapical patch.

Expanse, ♀  $2\frac{2}{10}$  inches.

*Dry form* (fig. 1 b, c, ♂ ♀). Smaller than in *Wet* form. Male. Upperside. *Forewing* with narrower outer marginal band, its posterior end much smaller. *Hindwing* with a slender outer band. Underside. Both wings with similar

ordinary markings to the Wet-form. *Forewing* with a more or less defined subapical patch.

Female. Upperside. *Forewing* with a broader black outer band than in male. *Hindwing* with a much broader outer band than in male. Underside. Both wings similar to male.

Expanse, ♂ 2  $\frac{6}{10}$  to 2  $\frac{8}{10}$  inch.

*Extreme Dry form* (fig. d, ♀). Male not seen. Female. Upperside. *Forewing* with a broad black outer band, its posterior portion angled obliquely outward from the lower median veinlet. *Hindwing* with a moderately broad outer band. Underside. Both wings with ordinary markings as in Dry form. *Forewing* with a prominent almost complete quadrate apical brown patch.

Expanse, ♀ 2 inches.

HABITAT.—Ceylon.

Of our illustrations on Plate 571, fig. 1 is from a wet-season male, and fig. 1a the female of an intermediate form, both specimens being in Col. C. Swinhoe's Collection; figs. 1b, c, male and female Dry-season form, and fig. 1d, of a female *Extreme Dry* form, in our own possession.

#### TERIAS ROTUNDALIS.

Plate 571, fig. 2, 2a (Wet); 2b, c (Dry).

*Terias rotundalis*, Moore, Lep. of Ceylon, i. p. 120, pl. 46, fig. 1, 1a, b, ♂ ♀ (1881)—*Wet form*.

*Terias Silhetana* (pt.) de Nicéville, J. As. Soc. Beng. 1899, p. 213.

*Wet form* (fig. 2, ♂, 2a, ♀). Male. Upperside bright yellow. *Forewing* with the black outer band similar to, but comparatively narrower than in same sex of *uniformis*, its posterior end slightly angled at the lower median veinlet. *Hindwing* with a very slender outer marginal band, or it is indicated only by linear spots at the vein tips. Underside pale yellow. Both wings with ordinary markings very indistinct. No subapical patch on forewing.

Female. Upperside paler yellow. *Forewing* with broader outer band than in male, the lower end larger and its inner edge extending obliquely outward. *Hindwing* with similar slender outer marginal line. Underside similar to the male.

Expanse, ♂ 1  $\frac{4}{10}$  to 1  $\frac{6}{10}$ ; ♀ 1  $\frac{4}{10}$  to 1  $\frac{8}{10}$  inch.

*Dry form* (fig. 2 b, c, ♂ ♀). Male. Upperside. *Forewing* with the outer band comparatively broader than in male of Wet form. *Hindwing* with the outer band slender and broken posteriorly. Underside. Both wings with distinct ordinary marks. *Forewing* with a more or less distinctly formed subapical patch.

Female. *Forewing* with the outer black band broader throughout than in male, its posterior inner end outwardly oblique. *Hindwing* with a narrow

continuous outer band. Underside. Both wings with the ordinary marks, and the subapical patch on forewing distinctly defined.

Expanse, ♂  $1\frac{6}{10}$  to  $1\frac{8}{10}$ ; ♀  $1\frac{6}{10}$  inch.

HABITAT.—Ceylon.

Of our illustrations on Plate 571, figs. 2, 2a are from the *types* of male and female *wet* season form, in our possession; 2b of a *dry*-season form from Kandy, in Col. C. T. Bingham's Collection, and fig. 2c of a female *dry* form taken at Pundaloya by Mr. E. E. Green, in our own collection.

#### TERIAS UNIFORMIS.

Plate 571, fig. 3, ♂ (*Wet*); 3a, b, ♂ ♀ (*Dry*).

*Terias uniformis*, Moore, Lep. of Ceylon, i. p. 120, pl. 46, fig. 2, 2a, b, ♂ ♀ (1881).

*Terias Templetoni*, Butler, Ann. Nat. Hist. 1886, p. 218, ♂ *Wet*. Moore, l.c. iii. p. 531 (*Wet*).

*Terias Silhetana* (pt.), de Nicéville, J. As. Soc. Beng. 1899, p. 213.

*Wet form* (fig. 3). Male. Upperside bright yellow. *Forewing* with the outer band somewhat broader throughout than in male *Wet rotundalis*, its lower end inwardly oblique. *Hindwing* also with the outer band broader and complete in its entire length. Underside with the ordinary marks more distinct.

Expanse, ♂  $1\frac{7}{10}$  to 2 inches.

*Dry form* (fig. 3, a, b). Male. Upperside paler than in *Wet*. Both wings with similar marginal band. Underside. Both wings with prominent ordinary brown markings, and *forewing* with subapical patch. Female. Upperside. *Forewing* with the marginal band similar to the male. *Hindwing* with the band similar but less defined. Underside. Both wings with somewhat less defined ordinary markings. *Forewing* with a brown, more or less complete, quadrate apical patch.

Expanse, ♂  $1\frac{4}{10}$ ; ♀  $1\frac{8}{10}$  to 2 inches.

HABITAT.—Ceylon.

Of our illustrations on Plate 571, fig. 3 is from the male *type* of *Wet*-season form in our own possession; 3a from a male *dry*-season form in Col. C. Swinhoe's Collection, and 3b, the female *dry* form in our own Collection.

#### TERIAS GRANDIS.

Plate 572, fig. 1, 1a, ♂ ♀ (*Wet*); 1b, ♀ (*Dry*).

*Wet form* (fig. 1, 1a). Male. Upperside paler yellow than in male of *Wet* form of *Hecabe* from the same localities. *Forewing* with the black marginal band comparatively broader at the apex, the posterior portion somewhat longer, and its inner edge irregularly rounded and inclined obliquely inward, this latter portion being much longer than in *Wet Silhetana*. *Hindwing* with broader marginal band than in *Wet Hecabe*. Underside. Both wings with indistinct ordinary *Wet* markings. *Forewing* with three cell-marks and the discocellular.

Female. Upperside. *Forewing* with broad marginal band similar to male. *Hindwing* with broader marginal band than in female *Wet Hecabe*. Underside. Both wings with less defined ordinary markings than in male.

Expanse, ♂ ♀ 2 inches.

*Dry form* (fig. 1b). Female. Upperside. *Forewing* with the marginal band as in *Wet*, except that the lower portion has its inner edge more outwardly oblique. *Hindwing* with the marginal band not quite so broad as in *Wet*. Underside. *Forewing* with the discocellular and cell-marks more distinct than in *Wet*, and with a more or less prominent subapical dark brown patch. *Hindwing* with distinct basal, discocellular, and zigzag discal markings. Male not known.

Expanse, ♀  $2\frac{2}{10}$  to  $2\frac{4}{10}$  inches.

HABITAT.—Upper Bengal; Assam; Chittagong.

DISTRIBUTION.—Col. C. Swinhoe possesses the male and female type specimens of the *Wet*-season form from the Khasia Hills and Cherra Punji, Assam, and also a female of the *Dry* form from Maldah, Upper Bengal, the latter taken in June by Mr. Irvine. We possess a female *dry*-season form from Nowgong, Assam, taken by Mrs. Span, and also a female from Chittagong taken in October. Col. C. T. Bingham has a *dry* female from Shillong, Assam, which was reared from pupa, in September, found on an *Acacia* tree.

Of our illustrations on Plate 572, figs. 1, 1a are from the *types* of male and female *Wet* form, 1b from female *Dry* form taken in Nowgong.

#### TERIAS SILHETANA.

Plate 572, fig. 2 ♂ (*Wet*); 2a, b, ♂ ♀ (*Dry*); 2c, d, e (*Extra Dry*).

*Terias Silhetana*, Wallace, Trans. Ent. Soc. 1867, p. 324, ♂ (*Extra Dry*). de Nicéville, Sikkim Gazetteer, 1894, p. 167.

*Terias Heliophila*, Butler, Ann. Nat. Hist. 1885, p. 338, pl. 8, fig. 2, ♂ (*Dry*). Watson, Journ. Bombay N. H. Soc. 1894, p. 511.

*Wet form* (fig. 2). Male. Upperside pale yellow. *Forewing* with a broad black outer marginal excavated band, the lower end much shorter than in *Wet grandis*, and its inner edge outwardly oblique. *Hindwing* with the outer band of moderate but slightly varying width. Underside pale yellow. *Forewing* with three cell-marks, discocellular mark, and also those on *hindwing* slightly defined. Female not seen.

Expanse, ♂ 2 inches.

*Dry form* (fig. 2a, ♂ 2b, ♀) = *Heliophila*. Male. Upperside. *Forewing* with the black band similar to *Wet*, its lower portion being smaller. *Hindwing* with the band comparatively narrower. Underside with similar markings as in *Wet* form, the forewing also having a more or less defined subapical patch.

Female. Upperside. *Forewing* with the black band, throughout, wider than in male. *Hindwing* with a broad outer band. Underside with the ordinary markings, and also the subapical patch on the forewing more distinctly defined than in the male.

Expanse, ♂ 2, ♀  $2\frac{2}{5}$  inches.

*Extreme Dry form* (fig. 2c, d, ♂ 2e ♀) = *Silhetana*. Male. Upperside. *Forewing* with the black band comparatively narrower than in the ordinary *dry* form, its lower portion from the upper median veinlet being more or less slender, and in some examples slightly angulated between the lower median and submedian. *Hindwing* with either a slightly indicated marginal thread, or a minute dot at end of the veins. Underside. Both wings with distinct ordinary markings. *Forewing* with a prominent brown almost completely filled-up quadrate apical patch, which has a short streak extending from below its middle.

Female. Upperside. *Forewing* with the black marginal band comparatively broader throughout than in male, its lower portion larger and more angled. *Hindwing* with a marginal slender broken thread. Underside. Similar to the male.

Expanse, ♂  $1\frac{6}{5}$  to 2 inches, ♀  $1\frac{8}{5}$  inch.

HABITAT.—Assam; Lower Sikkim.

DISTRIBUTION.—We possess males of the *wet* and *dry* season form from Assam, taken by Dr. G. Watt, and both sexes of the *dry* form labelled, “*Nepal*,” taken by General G. Ramsay probably in Lower Sikkim; also male *type* of the *Extra dry* form, named *Silhetana*, by Wallace. Col. C. Swinhoe has males of the *wet* and *dry* form from the Khasia Hills. Col. C. T. Bingham has males of *wet* and *dry* forms from Shillong, Assam, and also males of the *extra dry* form from Sikkim.

Of our illustrations on Plate 572, fig. 2 is from a male *wet*-season form from Silhet, Assam, in our Collection; 2a from a *dry* form from Sikkim in Col. C. Swinhoe’s Collection; 2b from a *dry* female from Sikkim, which we also possess; 2c from the *Extra Dry* male, from Silhet—this being the *type* specimen of Wallace’s *Silhetana*, from specimens in our possession; 2d, also a male of the *extra dry* form from the Khasia Hills, and fig. 2d, the female of *extra dry* form, from Sikkim, both of which are in Col. Swinhoe’s Collection.

#### TERIAS KANA.

Plate 573, figs. 1, 1a, ♂ ♀ (*Wet*), 1b, c, ♂ ♀ (*Dry*), 1d, e, ♂ ♀ (*Extra Dry*).

*Terias Kana*, Moore, Journ. Linn. Soc. Zool. 1886, p. 48, pl. 4, fig. 9, ♂ (*Dry*).

*Terias Sodalis*, Moore, l.c. p. 45 (*Extra Dry*).

*Terias Hecabe* (var.), Watson, Journ. Bombay N. H. Soc. 1896, p. 283.

*Terias Kana et Sodalis* (pt.), Butler, Ann. N. H. 1898, p. 73.

*Wet form* (fig. 1, 1a). Male. Upperside clear yellow. *Forewing* with the

black outer marginal band somewhat broader throughout than in male of local *Hecabe*, its lower portion being also broader. *Hindwing* with the marginal band twice as broad as in male of that species. Underside. Both wings with the ordinary markings indistinct. *Forewing* with two cell-marks only in addition to the discocellular.

Female. Upperside. Both wings with similar very broad outer marginal band, as in male; the band on the hindwing being broader than in female *Hecabe*. Underside as in male, the ordinary markings more distinct.

Expanse, ♂ ♀  $1\frac{8}{10}$  inch.

*Intermediate form.* Male. Upperside as in the Wet form. Underside with the markings more distinct. *Forewing* with a slightly defined subapical patch.

Expanse,  $1\frac{8}{10}$  inch.

*Dry form* (fig. 1b, c). Male. Upperside. *Forewing* with the outer marginal band similar shaped to the Wet form, and somewhat narrower throughout. *Hindwing* with narrower outer band than in Wet form. Underside. Both wings with distinctly formed brown ordinary markings, the discocellular mark broad and triangularly dentate. *Forewing* with a prominent brown subapical patch.

Female. Upperside. *Forewing* with slightly broader outer marginal band throughout than in male. *Hindwing* with the outer band half the width of that in female Wet form. Underside similar to the male.

Expanse, ♂ ♀  $1\frac{6}{10}$  to  $1\frac{8}{10}$  inch.

*Extreme Dry form* (fig. 1d, e) = *sodalis*. Male. Upperside. *Forewing* with similar, but somewhat broader, outer band, to the Dry form. *Hindwing* also with slightly broader outer band than in Dry. Underside with less-defined markings. *Forewing* with a prominent brown quadrate completely filled-up apical patch, which is dentate on its lower edge; a small slight brown streak is also present before the posterior angle of the wing.

Female. Upperside. *Forewing* with the outer band similar to ordinary Dry form. *Hindwing* with the band slightly broader. Underside. Both wings with less defined markings than in Dry. *Forewing* with quadrate apical patch as in the male, and also a small oblique dusky oblique streak before the posterior angle.

Expanse, ♂ ♀  $1\frac{6}{10}$  to  $1\frac{8}{10}$  inch.

**HABITAT.**—Lower Burma; Tenasserim; Mergui Archipelago.

**DISTRIBUTION.**—We possess both sexes of the *Wet* form, from Rangoon, Pegu, and a male of *Wet* form from Henzada, and *co-type* specimens of both sexes of the *Dry* form (*Kana*) from Mergui, also *co-types* of both sexes of the *Extra-Dry* form (*sodalis*): Dr. J. Anderson obtained the types of *Kana* in "Mergui in January on King Island, in January and February, and on Elphinstone Island in March, also

those of *sodalis* on King Island in February, and on Pataw Island in December" (l.c. pp. 44, 46).

Of our illustrations on Plate 573, figs. 1, 1a, male and female *Wet* form, from Rangoon, Pegu; 1b, c, male and female *Dry* form *co-types*, from Mergui; 1d, e, male and female *Extreme Dry* form, *co-types* of *sodalis*, from Mergui, taken in February.

#### TERIAS ANDERSONII.

Plate 573, figs. 2, ♂ (*Wet*), 2a, b, ♂ ♀ (*Dry*).

*Terias Andersoni*, Moore, Journ. Linn. Soc. Zool. 1886, p. 47, pl. 4, fig. 8, ♂ (*Dry form*). Watson, Journ. Bombay N. H. Soc. 1896, p. 282.

*Wet form* (fig. 2, ♂). Male. Upperside. *Forewing* with the outer marginal band moderately broad, the medial portion inclined slightly inward, and the lower portion very slightly inclined obliquely-outward. *Hindwing* with a moderately broad outer band. Underside with slightly defined ordinary markings. *Forewing* with two cell-marks, basal obsolescent. Female not seen.

Expanse, ♂  $1\frac{8}{10}$  inch.

*Dry form* (fig. 2a, b). Male. Upperside similar to the *Wet* form. Underside with the ordinary markings distinct. *Forewing* with a medial cell mark, and a more or less well-defined subapical patch.

Female. Upperside paler. *Forewing* with slightly broader outer band. *Hindwing* with a moderately broad outer band. Underside similar to the male.

Expanse, ♂  $1\frac{6}{10}$ , ♀  $1\frac{4}{10}$  to  $1\frac{6}{10}$  inch.

HABITAT.—Mergui Archipelago.

DISTRIBUTION.—Dr. J. Anderson obtained the *type* specimens of both sexes on "Sullivan Island, Mergui, in January, and on Elphinstone Island in March" (l.c. p. 48). We possess a male of the *Wet* form, and *co-type* of both sexes of the *Dry* form.

Of our illustrations on Plate 573, fig. 2 is from a male *Wet* form, and fig. 2a, b, *co-types* of male and female *Dry* form, in our possession.

#### TERIAS MERGUIANA.

Plate 573, figs. 3, ♂ (*Wet*), 3a, b, ♂ ♀ (*Dry*), 3c, d, ♂ ♀ (*Extr. Dry*).

*Terias Merguiana*, Moore, Journ. Linn. Soc. Zool. 1886, p. 47, pl. 4, fig. 7, ♂ (*Wet*).

*Terias Hecabe* (var.), Watson, Journ. Bombay N. H. Soc. 1896, p. 283.

*Wet form* (fig. 3, ♂). Male. Upperside yellow. *Forewing* with the outer marginal band less angled at upper median than in *Andersoni*, its posterior portion curving obliquely outward. *Hindwing* with the band narrower. Underside. Both

wings with slightly defined ordinary markings. *Forewing* with two cell-marks. Female not seen.

Expanse, ♂  $1\frac{6}{10}$  to  $1\frac{8}{10}$  inch.

*Dry form* (fig. 3a, b, ♂ ♀). Male. Upperside similar to Wet form. Underside with similarly defined ordinary markings. *Forewing* with pale ill-defined brownish subapical patch.

Female. Upperside. *Forewing* with the outer band comparatively broader than in male, its lower portion somewhat longer and distinctly curved outward. *Hindwing* with the outer band slightly broader than in male. Underside with the ordinary markings, and subapical patch as in male.

Expanse, ♂ ♀  $1\frac{8}{10}$  inch.

*Extreme Dry form* (fig. 3c, d, ♂ ♀). Male. Upperside. *Forewing* with the outer band similar to the ordinary Dry form, its lower portion slightly smaller. *Hindwing* with the band slender and almost macular. Underside. Both wings with similar ordinary markings to the Dry form. *Forewing* with three cell-marks, and a broad brown almost completely filled-up quadrate apical patch, with a short dentation from below its middle.

Female. Upperside. *Forewing* with the outer band slightly narrower than in ordinary Dry female, its lower portion being much smaller. *Hindwing* with the outer band slender. Underside with the ordinary markings more defined, the apical quadrate patch on forewing, as in the male, but less complete.

Expanse, ♂  $1\frac{7}{10}$  to  $1\frac{8}{10}$ , ♀  $1\frac{8}{10}$  to 2 inches.

HABITAT.—Burma; Tenasserim; Mergui Archipelago.

DISTRIBUTION.—Dr. J. Anderson obtained the *type* specimens in “Mergui in November and December, at Zeduwon in December, on Kisserang Island in December, Elphinstone Island in January and March, and on Sullivan Island in January” (*l.c.* p. 47). We possess *co-types* of both sexes from Mergui, and also both sexes from Bhamo, taken in November by Dr. L. Fea. Col. C. Swinhoe has specimens from the Younzaleen Valley, taken in November.

Of our illustrations on Plate 573, fig. 3 is from male *co-type* Wet form from Mergui; figs. 3a, male of Dry form from Younzaleen, and fig. 3b, a female Dry form from Bhamo; fig. 3c, a male *Extreme Dry* form from Younzaleen Valley, and 3d, a female from Bhamo.

#### TERIAS FRATERNA.

Plate 574, fig. 1, ♂ (Wet), 1a, b, ♂ ♀ (Dry).

*Terias fraterna*, Moore, Journ. Soc. Zool. 1886, p. 46, pl. 4, fig. 6, ♂ (Dry).

*Terias Hecabe* (var.), Watson, J. Bombay N. H. S. 1896, p. 282.

*Wet form* (fig. 1, ♂). Male. Upperside. *Forewing* with the outer band more

sinuous than in *Merquiana*, its posterior portion broader and less outwardly oblique. *Hindwing* with the band of similar width, or slightly broader. Underside with slightly defined ordinary markings, two in cell of forewing. Female not seen.

Expanse, ♂  $1\frac{8}{10}$  inch.

*Dry form* (fig. 1a, b, ♂ ♀). Male. Upperside. *Forewing* similar to wet form. *Hindwing* with the outer band somewhat narrower. Underside with the ordinary markings broader and more distinctly defined. *Forewing* with two cell-marks and a brown subapical patch.

Female. Upperside. *Forewing* with the outer band similar to male, its lower portion slightly broader. *Hindwing* with the band somewhat broader and more definitely dentated. Underside similar to the male.

Expanse, ♂  $1\frac{6}{10}$  to  $1\frac{8}{10}$ , ♀  $1\frac{8}{10}$  inch.

HABITAT.—Burma; Tenasserim; Mergui Archipelago.

DISTRIBUTION.—Dr. J. Anderson obtained the *type* specimens in “Mergui, December; King Island in February, and on Elphinstone Island in March” (*l.c.* p. 46). We possess *co-types* from Mergui.

Of our illustrations on Plate 574, fig. 1 is from a male of the *Wet* form, and figs. 1a, b, male and female of the *Dry* form from Mergui.

#### TERIAS PATRUELIS.

Plate 574, figs. 2, ♂ (*Wet*), 2a, b, ♂ ♀ (*Dry*), 2c, ♂ (*Inter. Dry*), 2d, ♂ (*Extra Dry*).

*Terias Patruealis*, Moore, Journ. Linn. Soc. Zool. 1886, p. 46, pl. 4, fig. 5, ♂ (*Dry*).

*Terias Silhetana*, Moore, *l.c.* p. 45. (*Extreme Dry*).—*nec* Wallace.

*Wet form* (fig. 2, ♂). Male. Upperside. *Forewing* with the black outer band of similar width to that in *fraterna*, the posterior end being smaller, and its inner edge slightly inclined obliquely inward. *Hindwing* with a narrow outer band. Underside. Both wings with indistinct ordinary markings. *Forewing* with two marks in the cell. Female not seen.

Expanse, ♂  $1\frac{8}{10}$  inch.

*Dry form* (figs. 2, a, b, ♂ ♀). Male. Upperside. *Forewing* with the outer band similar to *Wet* form, its posterior end inclined obliquely inward. *Hindwing* with narrow outer band. Underside. Both wings with slightly defined ordinary markings. *Forewing* with two cell-marks and a more or less defined subapical patch.

Female. Upperside. *Forewing* with slightly broader outer band than in male, its lower portion being comparatively longer. *Hindwing* with band narrower. Underside. Both wings as in the male.

Expanse, ♂  $1\frac{6}{10}$ , ♀  $1\frac{6}{10}$  to  $1\frac{8}{10}$  inch.

*Intermediate Dry form* (fig. 2c, ♂). Male. Upperside. *Forewing* with the band narrower than in the ordinary *Dry* form from below the upper median, and only slightly angled at the lower median. *Hindwing* with a more or less slightly-indicated marginal slender thread or obsolescent tip to the veins. Underside. Both wings with less-defined ordinary markings, and a similar subapical patch on the *forewing*.

Expanse, ♂  $1\frac{9}{10}$  inch.

*Extreme Dry form* (fig. 2d). Male. Upperside similar to the *Intermediate Dry* form. *Forewing* with the band slightly narrower from below the upper median. *Hindwing* with similar slender marginal line. Underside. Both wings with the ordinary markings more distinct. *Forewing* with a quadrate almost completely filled-up brown apical patch.

Expanse, ♂  $1\frac{9}{10}$  inch.

HABITAT.—Burma; Tenasserim; Mergui Archipelago.

DISTRIBUTION.—Dr. J. Anderson obtained the *type* specimens in “Mergui, in December; Elphinstone Island in March, and Pataw Island, in January” (*l.c.* p. 46). We possess a male of *Wet* form from Chittagong, and both sexes of the *Dry* form, and male of *Eatra Dry* form from Mergui, and Bhamo, the latter taken by Dr. L. Fea in November, also a male of *Dry* form from Toungoo, and *Intermediate Dry* male from Mergui and Bhamo; also *Extreme Dry* male from Moulmein. Col. C. Swinhoe also has the latter form from Moolai, Tenasserim.

Of our illustrations on Plate 574, fig. 2 is from a male *Wet* form from Chittagong; figs. 2a, b, from a male and female (*co-types*) of *Dry* form from Mergui; fig. 2c, a male of *Intermediate Dry* form; and fig. 2d, male of *Extreme Dry* form.

#### TERIAS NIKOBARIENSIS.

Plate 574, figs. 3, 3a, b, ♂ ♀ (*Wet*), 3c, ♂ (*Dry*).

*Terias Nikobariensis*, Felder, Verh. Zool. Bot. Ges. Wien. 1862, p. 480, ♂. Moore, Proc. Zool. Soc. 1877, p. 590. Wood-Mason and de Nicéville, Journ. As. Soc. Bengal, 1881, p. 236; *id. l.c.* 1882, p. 18.

*Wet form* (fig. 3, 3a, b, ♂ ♀). Male. Upperside yellow. *Forewing* with the black outer marginal band comparatively narrower throughout than in specimens of *Hecabe* from the same locality, its inner edge more evenly curved apically, less angular at upper median, the posterior portion smaller, and inclined obliquely inward. *Hindwing* with the outer band also somewhat narrower. Underside paler than upper; the ordinary markings slightly defined. *Forewing* with two cell-marks.

Female. Upperside sulphur-yellow. *Forewing* with the outer band com-

paratively narrower than in same sex of local *Hecuba*, its inner edge somewhat more angled at the upper median than in the male. Underside as in the male.

Expanse, ♂  $1\frac{2}{10}$  to  $1\frac{6}{10}$ , ♀  $1\frac{4}{10}$  inch.

*Dry form* (fig. 3c, ♂). Male. Upperside paler yellow. *Forewing* with the black outer band more irregular and angled apically, the posterior portion slightly excavated on its inner edge. *Hindwing* as in wet form. Underside with distinctly defined ordinary markings. *Forewing* with two marks in the cell, and a prominent brown subapical patch.

Expanse, ♂  $1\frac{8}{10}$  inch.

**HABITAT.**—Nicobar and Andaman Islands.

**DISTRIBUTION.**—Little and Great Nicobar; Car Nicobar; Nankoury; Andamans.

Of our illustrations on Plate 574, fig. 3 is from a male *Wet* form from Little Nicobar, exactly the same as Felder's *type* specimen, now in the Collection of Mr. Walter Rothschild; fig. 3a is also a *Wet* male, from Great Nicobar, and fig. 3b, a female *Wet* form from Nicobars; fig. 3c is from a male of the *Dry* form from the Andamans.

#### TERIAS BLAIRIANA.

Plate 575, fig. 1, ♂, 1a, ♀.

*Dry form.* Male. Upperside pale yellow. *Forewing* with comparatively broader black outer band than in *Andamana* and *Rapstorffii*, the posterior portion being also broader and larger, quadrate in shape, with its inner edge uneven. *Hindwing* with a minute black point at end of the veins, which are slenderly connected by marginal scales. Underside. Both wings with slightly defined ordinary markings. *Forewing* with a medial and smaller subbasal zigzag mark in the cell; also a slightly-defined broken greyish-black scaled subapical patch.

Female. Upperside. *Forewing* with similar broad outer band, its posterior portion projecting further inward. *Hindwing* with marginal black marks as in male. Underside similar to the male; the subapical patch on forewing more defined.

Expanse, ♂ ♀ 2 inches.

**HABITAT.**—Andamans.

The *type* of both sexes, from Port Blair, are in Col. C. T. Bingham's Collection.

#### TERIAS ANDAMANA.

Plate 575, fig. 2, ♂ (*Wet*); 2a, b, ♂ ♀ (*Dry*), 2c, ♀ (*Extr. Dry*).

*Wet form* (fig. 2, ♂). Male. Upperside pale yellow. *Forewing* with the

black outer band of normal width apically, and with a prominent dentation projecting between the second and third subcostals, the portion at posterior end being slightly convexly-inclined obliquely outward. *Hindwing* with a narrow black distinctly formed marginal band. Underside. Both wings with very indistinct ordinary markings, the veins and intermediate folds with a black point at their end.

Expanse, ♂  $1\frac{6}{10}$  inch.

*Dry form* (2a, b, ♂, ♀). Male. Upperside pale lemon yellow. *Forewing* with black marginal band as in Wet form. *Hindwing* with a slender black marginal thread, which is continuous and slightly dentated. Underside. Both wings with distinct ordinary markings. *Forewing* with a single subbasal mark in the cell; and a prominent slaty-black more or less complete apical patch, also a slight oblique streak near posterior angle, and a smaller spot above it.

Female. Upperside as in male. Underside as in male, the apical patch on *forewing* being more complete, and purplish-black.

Expanse, ♂  $1\frac{6}{10}$  to  $1\frac{8}{10}$ , ♀  $1\frac{6}{10}$  inch.

*Extreme Dry form* (fig. 2c, ♀). Female. Upperside. *Forewing* with the outer band broader than in *Dry form*. *Hindwing* with the outer band also somewhat broader, and its inner edge irrorated with black scales. Underside with similar distinct ordinary markings. *Forewing* with a single cell-mark, and a more completely filled-up quadrate apical patch, below which a slight squamous streak extends to the two near the posterior angle.

Expanse, ♀  $1\frac{6}{10}$  to  $1\frac{8}{10}$  inch.

HABITAT.—Andamans.

Described from specimens in our possession, and in the collection of Col. C. T. Bingham.

#### TERIAS RÆPSTORFFII.

Plate 575, figs. 3, ♂, 3a, ♀.

*Dry form* (fig. 3, ♂, 3a, ♀). Larger than *Andamana*. Male. Upperside pale lemon yellow. *Forewing* with the outer black band comparatively narrower, its posterior end smaller, and slightly concavely-inclined obliquely outward. *Hindwing* with a slender ill-defined squamous marginal broken thread. Underside with the ordinary markings not prominent. *Forewing* with three marks within the cell in addition to the discocellular; a subapical pale brown patch.

Female. Upperside. *Forewing* with similar outer band to male, its posterior end being broader. *Hindwing* with a broader squamose outer band than in male. Underside as in male.

Expanse, ♂ ♀ 2 inches.

HABITAT.—Andamans; Nicobars.

The male *type* specimen is in the Collection of Col. C. Swinhoe, from the Andamans. We possess the *type* of female, from the Nicobars.

### TERIAS CADELLII.

Plate 575, figs. 4, ♂, 4a, ♀.

*Dry form* (fig. 4, ♂, 4a, ♀). Male. Upperside pale lemon yellow. *Forewing* with the black outer band similar in shape, but narrower throughout than in *Rapstorffii*. *Hindwing* with indistinctly defined black marginal tip to the veins, or a very slender squamous thread. Underside similar to *Rapstorffii*. *Forewing* with three cell-marks.

Female. Upperside. *Forewing* similar to male. *Hindwing* with an ill-defined slender squamous marginal band. Underside similar to male.

Expanse, ♂  $1\frac{6}{10}$  to  $1\frac{8}{10}$ , ♀  $1\frac{8}{10}$  inch.

HABITAT.—Andamans; Nicobars.

The male *type* from Port Blair, Andamans, and the female from Nankoury Nicobars, are in Col. C. T. Bingham's Collection.

### TERIAS MOOREI.

Plate 575, fig. 5, ♂.

*Terias Moorei*, Butler, Annals Nat. Hist. 1886, p. 216, pl. 5, fig. 1, ♂; *id. l.c.* 1898, p. 72, ♂.

*Wet form*. Male. Upperside light yellow. *Forewing* with the costal base slightly irrorated with minute black scales; costa slenderly edged with black from the base to end of second subcostal, from thence narrowly widening apically, and then decreasing marginally to the posterior angle, its inner edge dentate-sinuate, the strongest denticles being at the anterior veinlets, and decreasing hindward. *Hindwing* with a minute black marginal dot at end of the veins, which are more or less very slenderly connected by grey scales. Abdomen above grey. Underside clear yellow. *Forewing* with the posterior border pale sulphur-yellow; a black dot near base of cell, followed by two slender zigzag marks, and then a double lined discocellular mark; the anterior veins marginally ending in a black dot. In some specimens (probably Dry form) a trace of an incipient subapical patch is visible. *Hindwing* with a small black ringlet mark in middle of cell, a double lined discocellular mark, a basal dot and a small subbasal circlet above the cell, a constricted circlet below the cell, and a discal zigzag series of squamous sinuous marks; the veins with a marginal black point at the tip. Female unknown.

Expanse, ♂  $1\frac{8}{10}$  to  $2\frac{2}{3}$  inches.

HABITAT.—Nicobars (Nankoury; Great Nicobar).

## INDO-MALAY, INDO-CHINA, JAPAN, AND PHILIPPINE SPECIES:—

*Terias Suava*, Boisduval, Spec. Gén. Lep. i. p. 670 (1836). This species is undeterminable from the description, and the locality "Bengal," as given for the type, is doubtless erroneous. Boisduval's Collection has passed into the possession of Mons. C. Oberthür, who has kindly sent me the (*presumed*) type for verification. This specimen has an original locality label "Ban," not "Bengal," the latter locality, as given by Boisduval, being undoubtedly erroneous. This specimen is certainly not identical with any known Indian species. "Ban" may be an abbreviation for Banda, or Banka Island.

*Terias Blanda*, Boisduval, Spec. Gén. Lép. i. p. 672 (1836). *Habitat.* Java.

*Terias Phanospila*, Felder, Reise Novara, Lep. ii. p. 209, ♂ (1865)—*Dry form.* T. Nicobariensis (pt.). Butler, Ann. Nat. Hist. 1898, p. 71. *Habitat.* Java.

*Terias Sari*, Horsfield, Catal. Lep. Mus. E. I. Compy., p. 130, ♀ (1829)—*Extr. Dry form.* Moore, *id. l.c. i.* p. 64 (1857). Distant, Rhop. Malay. p. 305, pl. 25, fig. 3, pl. 26, figs. 3 and 7, ♂ ♀ *Ectr. Dry* (1885). Snellen, Mid. Sumatra, Lep. p. 23, pl. 2, figs. 8, 9, ♂ *Ectr. Dry* (1892). T. Hecabe, var. A; Boisd. Sp. Gén. Lép. i. p. 669 (1836). T. Sari (pt.), Butler, Ann. Nat. Hist. 1898, p. 73. ? *Terias vallivolans*, Distant, *l.c.* p. 306, pl. 26, fig. 17, ♂ (*Wet*). *Habitat.* Java; Sumatra; Malay Peninsula; Borneo.

*Terias Toba*, de Nicéville, Journ. As. Soc. Bengal, 1895, p. 496, ♂ ♀. T. Hecabe, var. 1, Snellen, Mid. Sumatra, Lep. pl. 2, figs. 10, 11, ♀ *Dry form* (1892). ? T. Senna, Distant, Rhop. Malay. p. 307, pl. 26, fig. 13, ♂ ; pl. 25, fig. 14, ♀ (1885). *Habitat.* Sumatra; Malay Peninsula.

*Terias Snelleni* (*Terias Hecabe, var. 3*, Snellen, Mid. Sumatra, Lep. pl. 2, figs. 12, 13, ♂ *Wet form* (1892)). T. Silhetana, de Nicéville, *l.c.* 1895, p. 498. *Habitat.* Sumatra.

*Terias Tecmessa*, de Nicéville, Journ. As. Soc. Bengal, 1895, p. 498, ♂. T. Sari, var. a, Distant, Rhop. Malay. p. 305, pl. 26, fig. 3, ♀ (1885). *Habitat.* Sumatra; Penang.

*Terias latilimbata*, Butler, Ann. Nat. Hist. 1886, p. 221; ♂ ♀, pl. 5, fig. 5, ♂ (*Wet form*); *id. l.c.* 1898, p. 74. de Nicéville, Journ. As. Soc. Beng. 1895, p. 499. *Habitat.* Sumatra.

*Terias semifusca*, Butler, Ann. Nat. Hist. 1886, p. 222, pl. 5, fig. 8, ♀ (*Intermed. Dry*). de Nicéville, *l.c.* 1895, p. 499. *Habitat.* Sumatra.

*Terias bidens*, Butler, Ann. Nat. Hist. 1886, p. 222, ♂ ♀, pl. 5, fig. 7, ♀ (*Dry form*). de Nicéville, *l.c.* 1895, p. 499. *Habitat.* Sumatra.

*Terias Ada*, Distant, Ann. Nat. Hist. 1887, p. 271, ♀. *Habitat.* Borneo.

*Terias gradiens*, Butler, Ann. Nat. Hist. 1886, p. 223, pl. 5, fig. 9, ♂ (*Wet*); *id. l.c.* 1898, p. 78. *Habitat.* N. Borneo.

*Terias Tilaha*, Horsfield, Catal. Lep. Mus. E. I. Compy., p. 136 ♀ (1829). Boisd. Sp. Gen. Lep. i. p. 668. Moore, Catal. Lep. Mus. E. I. C. i. p. 64 (1857). Distant, Rhop. Malay. p. 303, pl. 25, fig. 8, ♂ *Dry* (1885). de Nicéville, Journ. As. Soc. Beng. 1895, p. 495. Butler, Ann. N. H. 1898, p. 79. *Habitat.* Java, Sumatra, Malay Peninsula; Borneo.

*Terias Nicévillei*, Butler, Ann. Nat. Hist. 1898, p. 79, ♂ ♀. *Habitat.* N.E. Sumatra.

*Terias Rahel* (Pap. Rahel, Fabricius, Mant. Ins. ii. p. 22 (1787); *id.* Ent. Syst. iii. p. 204 (1793). Butler, Catal. Fabr. Lep. Brit. Mus. p. 227 (1869); *id.* Ann. N. H. 1898, p. 79. Staudinger & Schatz, Exot. Schmett. ii. p. 28, pl. 16, ♂ (1892). *Habitat.* Borneo.

*Terias Sinensis*, Lucas, Rev. Zool. 1852, p. 429. Wallace, Tr. Ent. Soc. 1867, p. 325. Butler, Ann. N. H. 1898, p. 78. *Habitat.* China (Lucas). Sulu Archipelago (Butler).

*Terias unduligera*, Butler, Proc. Zool. Soc. 1880, p. 668 (*Wet*); *id.* Ann. N. H. 1898, p. 68. *Habitat.* Foo-Chow; N. Formosa.

*Terias Hobsoni*, Butler, Proc. Zool. Soc. 1880, p. 668 (*Wet*). *Habitat.* Formosa.

*Terias Æsiope*, Menétrries, Catal. Mus. Petrop. Lep. i. p. 85, pl. 2, fig. 3, ♀, *Dry form* (1855). Butler, Ann. Nat. Hist. 1886, p. 219. *Syn.* *T. subdecorata*, Moore, Proc. Zool. Soc. 1878, p. 699, ♀ only. *T. Hecabe*, Butler, Ann. N. H. 1898, p. 69. Male. *Dry form*. Upperside. *Forewing* with the black marginal band as in Menétrries' figure, except that its posterior end is slightly larger. *Hindwing* with a slight marginal tip at end of the veins. Underside. Both wings with the same shaped large discocellular mark and other markings, and forewing with subapical patch as in his figure. Female (= *subdecorata*, ♀). This agrees exactly with Menétrries' figure, on upperside and underside, and also in size. *Expanse*, ♂ 2, ♀ 2 to  $2\frac{1}{10}$  inches. *Habitat.* S.E. China. Hainan; Formosa.

*Terias subdecorata*, Moore, Proc. Zool. Soc. 1878, p. 699, ♂ only (*Dry form*). *Syn.* *T. arcuata*, Moore, *l.c.* p. 700, ♂ (*Dry*). *Habitat.* Hainan.

*Terias attenuata*, Moore, Proc. Zool. Soc. 1878, p. 700, ♂ (*Dry form*). *Habitat.* Hainan.

*Terias Anemone*, Felder, Wien. Ent. Monats. 1862, p. 23. Pryer, Ent. M. Mag. 1877, p. 52. Elwes, P. Z. S. 1881, p. 881. Butler, Trans. Ent. Soc. 1880, p. 199, pl. 6, figs. 8-11. *Habitat.* Ningpo; Chekiang, S.E. China; Nikko, Japan.

*Terias Mariessii*, Butler, Trans. Ent. Soc. 1880, p. 198, pl. 6, figs. 1-6, ♂. Leech, Butt. China, p. 428 (1893). *Habitat.* Nikko, Japan.

*Terias Mandarina*, De Lorza, Lep. Japan, p. 18 (1869). Butler, Tr. Ent. Soc. 1880, p. 196, pl. 6, figs. 13-17. Elwes, P. Z. S. 1881, p. 881. Leech, Butt. China,

p. 428, 1893. Walker, Tr. Ent. Soc. 1895, p. 465. *Habitat.* Japan; Hong Kong; Shanghai; Chusan.

*Terias Hybrida*, Butler, Tr. Ent. Soc. 1880, p. 199, pl. 6, fig. 7. Leech, l.c. p. 428. *Habitat.* Nikko, Japan.

*Terias conneriva*, Butler, Tr. Ent. Soc. 1880, p. 199, pl. 6, fig. 12. Leech, l.c. p. 428 (1893). *Habitat.* Nikko, Japan.

*Terias Luzoniensis* (Pap. Luzoniensis, Linnaeus, Mus. Ulr. [text P. Hecabe], p. 249 (1764). = Petiver, Gazoph. pl. 28, fig. 9 (1702). T. Hecabe, Semper, Reis. Phil. Lep. p. 255, pl. 41, figs. 13, ♂ fig. 14, ♀ *Ectr. Dry* (1891). *Habitat.* Mindanao; Luzon.

*Terias Vallivolans*, Butler, Ann. Nat. Hist. 1883, p. 420. Semper, Reis. Philip. Lep. p. 253, pl. 41, figs. 3, 4, ♂ *Wet*, 5, ♀ (1891). *Habitat.* Mindanao, Samar; Manila, Philippines.

*Terias simulatrix*, Semper, Reis. Philip. Lep. p. 253, pl. 41, figs. 7, 8, 9, *Dry* (1891). *Habitat.* Philippines.

*Terias Sarilata*, Semper, l.c. p. 254, pl. 41, figs. 10, ♂ *Ectr. Dry*, 11, 12 ♀ (1891). Butler, Ann. N. H. 1898, p. 73. *Habitat.* Mindanao; Davao, Philippines.

*Terias diversa*, Wallace, Tr. Ent. Soc. 1867, p. 324; Semper, l.c. p. 255, pl. 41, figs. 15-17 (1891). *Habitat.* Manila; Mindoro; Mindanao.

*Terias Alitha*, Felder, Wien. Ent. Monats. 1862, p. 289 (1862). Semper, l.c. p. 256, pl. 41, figs. 21-24, ♂ ♀ (1891). Butler, Ann. N. H. 1898, p. 81. *Habitat.* Mindanao; Davao, Philippines.

*Terias invida*, Butler, Ann. N. H. 1883, p. 418, ♂. Semper, l.c. p. 256, pl. 41, figs. 18-20, ♂ ♀ (1891). *Habitat.* Sulu Islands; Samar; Camotes.

#### Genus CATOPSILIA.

*Catopsilia*, Hübner, Verz. bek. Schmett. p. 98 (1816). Scudder, Syst. Rev. Amer. Butt. 37 (1872).

Moore, Lep. Ceylon, i. p. 121 (1881). Distant, Rhop. Malay. p. 295 (1885). Staudinger and Schatz, Exot. Sch. p. 154 (1883). Semper, Reis. Phil. Lep. p. 257 (1891). Leech, Butt. China, ii. p. 423 (1893). Kirby, Allen's Nat. Libr. Lep. ii. p. 225 (1890).

*Murtia* Hübner, Verz. bek. Schmett. p. 98 (1816).

*Callidryas* (pt.), Boisduval; Doubleday, Butler.

*Colias* (pt.), Godart; Horsfield.

Wings broad. *Forewing* subtriangular; costal vein extending to two-thirds the margin; subcostal vein much arched at the base, first branch emitted at more than one-half before end of the cell, and extending close alongside the costal, second branch from end of the cell, third trifid, the fifth at one-third beyond the cell; discocellulars slightly oblique, both angled inward, the radial from their middle; the middle median veinlet at one-fourth, and lower at one-half before end of

the cell; submedian vein slightly waved. *Hindwing* broadly obconical; precostal vein very short; costal vein bent upward at the precostal; first subcostal branch at one-third before end of the cell; the cell very broad; discocellulars very oblique, lower bent near the middle, the radial from the angle; middle median branch at nearly one-fifth, and lower at nearly one-half before end of the cell; submedian vein straight, internal vein slightly curved. *Body* stout; thorax clothed with long silky hairs; palpi porrect, projecting one-third beyond the head, second joint laxly squamose, third short; legs slender; antennæ gradually thickened to end, tip blunt. *Male*. *Forewing* beneath with an elongated brush-like tuft of long, fine silky hairs extending along the edge of the posterior margin, from the base to near one-half its length, this tuft is either recumbent and flattened, along the margin of the wing, or, it is sometimes exserted and outspread, and is then projected in its entire length, along the *upperside* of the wing. *Hindwing* above with a conspicuous elongated-oval raised patch of *glandular* scales extending above the subcostal vein to its first branch, this patch being visibly opaque on holding the wing up to the light.

**LARVA**.—Cylindrical, slender, granulated; green or grey, with black dots, and a lateral pale line. Feeds on *Cassia* (*Leguminosæ*). **PUPA** moderately stout, pointed at each end, dorsally humped.

**TYPE**.—C. Crocale.

**MIGRATORY HABITS: IN CEYLON**.—Dr. N. Manders writes: “*Catopsilia Pyranthe* occurs in Ceylon under many different forms, three of which, besides *Pyranthe*, have received names, *Ilea*, *Chryseis*, and *Gnoma*. The latter is usually called the *dry-season* form, and *Chryseis* the *wet*, and though *Gnoma* is certainly more common in the dry, it is by no means confined to the dry months, neither is *Chryseis* confined to the *wet*. It may be said that all the forms occur indiscriminately all the year round, and my first object was to ascertain which was the *dry* form and which the *wet*, and what would be the several effects of heat, moisture, &c., on the larvæ and pupæ. The first thing was to ascertain the proportion of each variety, and this I left in Mr. Wickwar’s hands, and in the month of February, 1903, during a migratory flight, he captured sixty specimens, the weather at the time being very *dry* and hot. He mentions that 75 per cent. were males, . . . . and quite independently we had observed that the *wet-season* flight in November and December were almost all females. I cannot account for this further than to say that possibly during the dry months, owing to a more scanty and drier foliage, the female larvæ succumbed; whereas with the damper and more luscious foliage of the wet months they had no difficulty in surviving. The mystery of these migrations may be explained, to some extent, by this preponderance of the sexes during the different flights. By a coincidence, a migratory flight of butterflies was in full swing on the day

I landed in Ceylon, October 25th, 1895, and I certainly thought that I had stepped into a land of butterflies. The harbour, streets, and large promenade, the Galle Face of the seashore, was alive with butterflies, and, being mostly composed of *Catopsilia*, looked like a snow-storm. In order to gain some idea of their numbers, I selected two points, one at the edge of the sea and the other twenty yards from it, and then counted them as they flew past. The result of my calculation, and that of my companion, taken separately, gave 14,000 insects between 10 a.m. and 2 p.m. The flight usually lasts about a week; we have therefore 98,000 butterflies passing through a space sixty feet broad in twenty-eight hours. In round numbers 100,000. . . . . The butterflies, in whatever part of the island they happen to be hatched, immediately begin to migrate, so that on the same day the migration is as vigorous in one part of the island as in another. As the butterflies hatch in Colombo they immediately fly north, and their places are promptly filled by the insects coming up from Galle, the Galle ones by those from Hambantotte, and so on, round to Trincomalee, beyond which, in the uninhabited country to the north, I have been unable to trace them. The proof that the insects on the Trincomalee side really do follow the coast, and come to Colombo, is shown by the fact that it is only during the flights that certain butterflies, otherwise confined to that portion of the island, *Papilio Jason*, for instance, occur at Colombo, and are there seen migrating in the same frantic haste as their companions. On one occasion, on December 2nd, i.e. in the *wet-season*, I was observing the flight from Fort Frederick, Trincomalee. The butterflies came from the northern shore straight across the sea to the end of the peninsula on which Fort Frederick is built; several bushes of the food-plant of *Catopsilia Pyranthe* were growing there, and these were literally covered with eggs, as many as half a dozen on a single leaf; the bushes were so speckled with the multitude of eggs that they looked as if handfuls of sago had been scattered over them. The flights in November and December on both sides of the island undoubtedly comprise a majority of females, but scarcely a single larva out of this multitude of eggs could possibly have come to maturity; there was not enough food for half of them, and on a previous migration the bushes not far off were completely stripped by the larvae. The insects comprising the coast flight are almost entirely *Catopsilia*, two species of *Appias*, *Euploea Isela* and *Montana*, in the Hill districts, and *Danais septentrionis* irregularly. I should have mentioned that the process of laying eggs was totally contrary to what one usually observes—there was no attempt to choose a suitable leaf, no deliberation displayed about the operation at all, but every female seemed possessed with the one idea of getting rid of her eggs with the utmost expedition, utterly regardless of the fate of the future larvae, and then madly continuing her flight. When in full migration they fly with great rapidity, and can give points to *Colias edusa*.

They select the sea-coast, I feel sure, simply to avoid obstacles. The road between Trincomalee and Kandy, which runs through dense forest, is also largely used by the migrating insects. When travelling south they have the N.E. monsoon behind them, but when turning north they meet a stiff wind which really seems to drive them to a faster flight. The breadth of the flight is usually not more than a quarter of a mile.

“The reason for these flights is at present very obscure; it was probably originally a question of food-supply. This instinct might have arisen from the necessity for constantly seeking new feeding-grounds for the larvæ. As the species increased, this tendency to expand would not only preserve the species, but would cause in time its very material increase; the necessity for constantly enlarging the feeding-grounds would in time produce an inherited tendency to migrate. But in due course, when all available feeding-grounds were occupied, as they soon would be, in a small island like Ceylon, some check would be required to keep the enormous number of resulting butterflies within due bounds, otherwise the species would be in danger of annihilation from their very numbers. This appears to me to be effected in the following manner:—The insects of the *wet-season* migration are mostly composed of females, and provided that the males can successfully impregnate more than one female, the result would be an enormous number of eggs laid, and this I have shown to be the case. The migratory instinct is so strong that the females are precluded from taking any precautions for their future offspring, as the females of most butterflies do; and the result is that the struggle for existence among the multitude of larvæ subsisting on the food-plant, which is quickly diminishing by their voracity, and also slowly by the heat and dry weather, is so great that the larvæ which would produce female butterflies succumb, and a great majority of males are produced which form the dry-weather flights. This majority of males would also be another factor in checking the increase of the species. During the intervening portion of the year the species would gradually increase, until the wet months at the fall of the year favour a luxuriant vegetation, and all the female larvæ then survive, and possibly being stronger crowd out the male larvæ. These larvæ produce the overwhelming proportion of females in the next *wet-season* flight, with the result shown above. This migratory instinct, originally due to a necessity for the increase of the species, is now become a means of preventing its undue propagation.” (Trans. Ent. Soc. Lond. 1904, pp. 701-6.)

MIGRATORY HABITS: IN BURMA.—Col. C. T. Bingham writes whilst “returning down the Salween to Moulmein, on a hot steamy day in October, and when below Shwegon, I noticed clouds of butterflies, chiefly *Catopsilia*, migrating, crossing the Salween from East to West in a continuous stream” (Tr. Ent. Soc. 1902, 363).

## CATOPSILIA CROCALE.

Plate 576, fig. 1, 1a, ♂ ♀ (Wet); 1b, larva and pupa; 1c, d, ♀ (Extreme Wet); 1e, f, ♂ ♀ (Dry); 1g, h, ♀ (Extreme Dry).

*Papilio Crocale*, Cramer, Pap. Exot. i. pl. 55, fig. C, D, ♀ (1775).

*Catopsilia Crocale*, Hübner, Verz. bek. Schmett. p. 98 (1816). Moore, Lep. of Ceylon, i. p. 122, pl. 48, fig. 1, 1a, b, ♂ ♀, larva and pupa (1881). Wood-Mason and de Nicéville, Journ. As. Soc. Beng. 1881, p. 251. Kheil, Rhop. Nias, p. 35 (1884). Swinhoe, Proc. Zool. Soc. 1884, p. 511; id. 1885, p. 140; id. 1886, p. 432; id. J. Bombay N. H. S. 1887, p. 279. de Nicéville, J. As. Soc. Beng. 1885, p. 50; id. Sikkim Gaz. 1894, p. 166. Distant, Rhop. Malay. p. 296, pl. 25, figs. 11, 12, ♂ ♀ (1885). Doherty, J. As. Soc. Beng. 1886, p. 135. Moore, Journ. Linn. Soc. Zool. 1886, p. 49. Elwes, Tr. Ent. Soc. 1888, p. 411. Hampson, J. As. Soc. Beng. 1888, p. 361. Taylor, Butt. of Orissa, p. 14 (1888). Semper, Reise Phil. Lep. p. 257 (1891). Ferguson, J. Bomb. N. H. Soc. 1891, p. 444. Davidson and Aitken, J. Bomb. N. H. Soc. 1890, p. 360; id. 1896, p. 570. Leech, Butt. of China, ii. p. 423 (1893). de Nicéville, J. As. Soc. Beng. 1895, p. 490; id. 1899, p. 211; id. 1900, p. 251. Mackinnon, J. Bombay N. H. Soc. 1895, p. 586. Walker, Tr. Ent. Soc. 1895, p. 464. Adamson, List Burm. Lep. p. 41 (1897). Dixey, Proc. Ent. Soc. 1902, p. xvi. Butler, Ann. Nat. Hist. 1904, p. 413.

*Callidryas Crocale*, Boisd. Spéc. Gén. Lép. p. 625 (1836). Butler, Lep. Exot. i. p. 22, pl. 9, figs. 1—6, ♂ ♀ (1871). Druce, P. Z. S. 1873, p. 355. Moore, P. Z. S. 1878, p. 837.

*Papilio Alcmeone*, Cramer, Pap. Exot. ii. pl. 141, fig. E, ♂ (1777)—Wet form.

*Colias Alcmeone*, Godart, Enc. Méth. ix. p. 97 (1819). Horsfield, Catal. Lep. Mus. E. I. Compy. p. 131 (1829).

*Callidryas Alcmeone*, Boisd. Sp. Gén. Lép. i. p. 627 (1836). Moore, Catal. Lep. Mus. E. I. C. i. p. 56, pl. 1, figs. 7, 7a, larva and pupa (1857); id. P. Z. S. 1865, p. 493. Wallace, P. Z. S. 1866, p. 357.

*Catopsilia Alcmeone*, Hübner, Verz. bek. Schmett. p. 98 (1816).

*Papilio Jugurtha*, Cramer, Pap. Exot. ii. pl. 187, fig. E, F, ♀ (1777)—Wet form.

*Colias Jugurthina*, Godart, Enc. Méth. ix. p. 96 (1819). Horsfield, l.c. p. 132 (1829).

*Catopsilia Jugurthina*, Butler, Ann. Nat. Hist. 1888, p. 202.

*Papilio Catilla*, Cramer, Pap. Exot. iii. pl. 229, figs. E, F, ♀ (1779)—Extreme Dry form.

*Colias Catilla*, Godart, Enc. Méth. ix. p. 95 (1819).

*Callidryas Catilla*, Butler, Lep. Exot. i. p. 24, pl. 9, figs. 7-10, ♂ ♀ (1871).

*Catopsilia Catilla*, Moore, Lep. Ceylon, i. p. 122, pl. 47, figs. 3, 3a, ♂ ♀ (1881). Distant, Rhop. Malay. p. 297, pl. 25, figs. 15, 16, ♂ ♀ (1885). Elwes, Tr. Ent. Soc. 1888, p. 411. Manders, id. l.c. 1890, p. 533. Swinhoe, P. Z. S. 1885, p. 140; id. 1886, p. 432; id. Tr. Ent. Soc. 1893, p. 309. Adamson, List Burm. Lep. p. 41. (1897).

*Papilio Hilaria*, Cramer, Pap. Exot. iv. pl. 339, figs. A, B, ♂ (1781)—Dry form.

*Catopsilia Hilaria*, Hübner Verz. bek. Schmett. p. 98 (1816).

*Colias Hilaria*, Godart, Enc. Méth. ix. p. 97 (1819).

*Callidryas Hilaria*, Boisd. Sp. Gén. Lep. i. p. 626 (1836).

*Catopsilia Heera*, Swinhoe, Proc. Zool. Soc. 1885, p. 140, ♂ ♀.

*Catopsilia Pomona* (pt.), Fruhstorfer, Deuts. Ent. Zeit. 1902, p. 273. Butler, Ann. Nat. Hist. 1904, p. 413—*nec* Fabr.

? *Pap. Lalage*, Herbst, Nat. Syst. Ins. v. p. 163, pl. 106, fig. 1, 2, ♂ (1792).

*Wet form* (figs. 1, 1a, ♂ ♀). Male. Upperside. Both wings white, the basal areas sulphur-yellow. *Forewing* with the costal edge anteriorly, and the exterior margin slenderly black bordered, the inner edge of the border being slightly sinuous at the apex. Underside pale yellow. *Forewing* with the lower discal area white. *Hindwing* sometimes with a slightly-defined small ochreous streak on upper discocellular veinlet. *Forewing* beneath with an elongated brush-like tuft of long, fine silky hairs, extending along the edge of the posterior margin, from base to near half its length, this tuft being either recumbent and flattened, along the margin, or, it is sometimes exserted and outspread, and is then projected along the upperside of the wing in its entire length. *Hindwing* above with a conspicuous elongated-oval raised patch of *glandular* scales extending above the subcostal vein to its first branch, this patch being visibly opaque on holding the wing up to the light.

Female. Both wings with the basal yellow tint more widely extended, and sometimes pervades the entire wing. *Forewing* with the black costal band extending broadly from near the base to upper end of the cell, where it is more or less confluent with a round black discocellular spot, from whence it runs outwardly more narrowly, then widening apically, and continues sinuously down the exterior margin to posterior angle, the anterior portion being subapically traversed by three or four white spots, and lower disconnected inwardly-oblique sinuous black streaks. *Hindwing* with a broad sinuous-edged continuous black band. Underside similar to the male. Antennæ in both sexes greyish-black above, pinkish-grey below.

Expanse, ♂ ♀  $2\frac{4}{10}$  to 3 inches.

*Intermediate or Extreme Wet form* (fig. 1, c, d, ♀). Female. Upperside. Both wings either very faintly yellow-tinted basally, or white throughout. *Forewing* with the extreme base sometimes grey-tinted; with broader subbasal-costal black band and its continuous discocellular patch, apical and marginal band enclosing its subapical white spots, the sinuous or sometimes diagonal marks below the latter extending to the lower median interspace. *Hindwing* with a broad marginal band, and more or less defined confluent submarginal diffused lunules. Underside similar to *Ordinary Wet* female.

Expanse, ♀  $2\frac{5}{10}$  to 3 inches.

*Ordinary Dry form* (fig. 1e, f, ♂ ♀). Male. Upperside. Both wings with the basal yellow tint more restricted than in ordinary *Wet* form. *Forewing* with the outer marginal band more or less slightly macular posteriorly. Underside more uniformly paler than in *Wet* form. *Forewing* with a lower discocellular nacreous-centred red spot, a very indistinctly-defined reddish transverse subapical inwardly-oblique narrow sinuous fascia, and a slight fascia bordering the apex of wing. *Hindwing* with a similar lower discocellular nacreous spot, which is outwardly ringed by a slender red line, and is accompanied by a smaller more or less defined similar

ringed contiguous spot placed outwardly above it. Tuft on *forewing*, and glandular patch on the *hindwing*, as in ordinary *Wet* male.

Female. Upperside. Both wings with the ground-colour either as in the male, or uniformly pale yellow-tinted throughout. *Forewing* with a large black lower discocellular spot (which is either round, diagonal, or lobate); the marginal black band broader, more sinuous-edged, and generally broken posteriorly, the anterior portion accompanied by a more or less defined subapical series of five or six dentate lunules, and, generally, two lower less apparent spots, those from the lower subcostal veinlet being disposed obliquely inward. *Hindwing* with a marginal row of blackish dentate lunules. Underside more or less pale or brighter yellow than in male. *Forewing* with the posterior area white; discocellular reddish spot larger, the subapical sinuous fascia generally more defined, and apical band broader. *Hindwing* with the discocellular nacreous-centred spots larger, beyond which is a discally-curved zigzag series of more or less apparent reddish-scaled dentate lunules, and a marginal dot at tip of the veins. Antennæ in both sexes pinkish-grey.

Expanse, ♂  $2\frac{4}{10}$  to  $3\frac{2}{10}$ , ♀  $2\frac{6}{10}$  to  $3\frac{2}{10}$  inches.

*Extreme Dry form* (fig. 1g, h, ♀). Female. Upperside uniformly whitish or pale yellow-tinted. Both wings similar to ordinary *Dry* female. Underside brighter yellow than in ordinary *Dry* form. *Forewing* with the discocellular spot more or less obscured, and generally surrounded by a large reddish-brown angle-edged patch; the subapical sinuous fascia prominent and reddish-brown edged outwardly, the apical band less defined. *Hindwing* with the two nacreous discocellular spots very prominent, and generally very broadly surrounded by a large angle-edged reddish-brown upper-medial patch extending from within base of the cell to costal vein, its outer edge forming the outline of upper-discal zigzag marks; the lower-discal zigzag marks being more or less defined.

Expanse, ♀  $2\frac{8}{10}$  to 3 inches.

**HABITAT.**—Western, Central, Eastern Himalayas; Upper and Lower Continental India; Ceylon; Andaman and Nicobar Islands; Burma; Tenasserim; Siam; Tonkin; Annam; Formosa; C. and S.E. China; Malay Peninsula; Sumatra; Java; Borneo; Philippines.

**LARVA.**—“(Catilla). Colour green, with a spiracular white band touched with bright yellow on segments two to five, and these segments, especially the third and fourth, are distinctly flanged on the spiracular line as in the larva of *Hebomoia australis*, though not to so great an extent. The head is round, green, the clypeus edged with brown, covered with small, shiny, black tubercles, which are not very large, and do not hide the colour of the head; the anal flap is rounded, but looks square at the extremity, and is covered with small tubercles, not black, but green, each bearing a short hair; the body is covered with rows of small black tubercles,

of which only the row along the spiracular line is conspicuous; the spiracles are oval, shiny and white. Length 51 mm."

PUPA.—"The pupa has the dorsal line of the thorax absolutely parallel to the longitudinal axis for two-thirds its length; consequently the hinder part just before the margin is perpendicular to this parallel part, i.e. is raised suddenly though very slightly above the front margin of segment four, and the front end of this parallel dorsal line is at an angle, and a sharpish angle, with the front slope of the thorax; the shoulder, too, is distinctly angled, the point where the lateral line of the head and segment two meet that of the wings—the front margins of segments nine and ten in the dorsal line—when looked at sideways show a minute peak overhanging the hinder margins of segments eight and nine; the cremaster is distinctly bifid at the extremity, and has some shiny, very short, black suspensory hooks dorsally as well as at the extremity. There is a dorsal rugose black tip to the snout terminating the head, which snout is cylindrical in its apical half; there is no black line round the eyes, and there is a dark green-blue dorsal line, which is yellow on the thorax, as well as the supra-spiracular yellow line. Length 34 mm." (T. R. Bell and de Nicéville, Butt. of Kanara, J. Bombay N. H. Soc. 1900, 251.)

EGG.—"Single, on leaf. Pale yellowish-white, sharply pointed at each end, and attached by one point to the leaf. Larva, when emerged from the egg, is pale green, the head larger than any succeeding segment." (Capt. A. M. Lang, Umballa, MS. Notes, Sept. 2nd, 1861.)

FOOD-PLANTS.—"We have found the larva of *Crocale* on several species of *Cassia*, all arboreal, such as *C. fistula* and *Sumatrana*, but never on the humble and ill-smelling *C. occidentalis*, the food-plant of *C. Pyranthe*. We have found it abundantly in the Kanara District of Bombay, at the end of the rainy season, and also in April." (J. Davidson and E. H. Aitken, l.c. 1890, 360.)

DISTRIBUTION, HABITS, &c.—In the North-Western Himalaya Capt. A. M. Lang "found the butterfly frequenting the *Cassia fistula*, which is indigenous to the lower slopes of the outer ranges, 2,000 to 5,000 feet elevation, but an introduced plant in gardens in the plains of N. India" (Ent. Mo. Mag. 1864, 103). Mr. P. W. Mackinnon records *C. Cascale* and *Catilla*, as "occurring commonly in Masuri, N.W. Himalaya, from July to October, and in Dehra Dun throughout the warmer months of the year" (J. Bombay N. H. Soc. 1898, 586). Major J. W. Yerbury obtained it in N.W. India, at "Hassan Abdal, 1,600 feet above sea level, in June; at Chittar, between Tret and Barracoo, Murree road, 2,500 to 5,000 feet, in October; and at Hurripur, in October" (Ann. Nat. Hist. 1888, 202). Mr. W. Doherty obtained it at "Bagheswar, Ranibagh, Jakula Kali Valley, from 1,000 to 6,000 feet, in Kumaon" (J. As. Soc. Bengal, 1886, 135).

Capt. A. M. Lang, writing from Umballa, Sept. 2nd, 1861, says, "*C. alcmeone*

in considerable numbers have been flying over the trees of *Cassia fistula* during the end of August. I captured many in my garden, and found the eggs and larvæ in all stages. The egg, laid singly, on leaf, is pale yellowish-white, sharply pointed at each end. The largest larva found on Sept. 2nd was  $2\frac{1}{2}$  inches long, of a uniform breadth throughout, except at the head and last segment; colour deep grass-green, darkest along the back, and shading slightly lighter towards the lateral stripe, which is a creamy yellowish white; the green is shagreened by transverse ridges of points, their minute extremities being black; both the lateral stripe and the part of the dark green occupying the space between it and the legs is glazed; stigmata scarcely perceptible, creamy-white, and lying partly in, partly below lateral stripe; abdomen very bright cream, almost white; the abdominal and true legs of the same colour and a shade deeper; head grass-green, irrorated with minute black points; immediately above the lateral stripe, in large specimens, the irrorations become larger black points, and form a more or less uninterrupted line of black points distinguishable above the stripe. The larva feeds on the upper surface of the leaf, generally lying along the midrib." (MS. Notes.)

Col. C. Swinhoe records *C. Crocale*, "taken at Mhow, Central India, in July, and *Catilla*, common, from September to April" (P. Z. S. 1886, 432). Col. Swinhoe also records taking "a single female in Karachi, in 1879, and another female was taken in July, 1882 (*id. l.c.* 1884, 511), and in the District of Bombay and the Deccan," he obtained *Crocale* at Poona, in June and October; Ahmednuggur, in June; Belgaum, September; Bombay, August to November. The form named *Heera* having been taken at Belgaum in September, and at Poona in November and December, and *Catilla* being "common all the year round; the larvæ found feeding on the Sumatran *Cassia*, length  $1\frac{1}{2}$  to 3 inches in the hot weather, and from  $2\frac{1}{2}$  to 3 inches in the rains; larval stage being from 18 to 22 days" (*id. l.c.* 1885, 140). Messrs. J. Davidson and E. H. Aitken record it as being "found abundantly, in the Kanara District of Bombay, at the beginning and end of the rainy season, and also in April. We found the larva on several species of *Cassia*, all arboreal, such as *fistula* and *Sumatrana*. They refuse *C. occidentalis*—the food of *C. Pyranthe*. The larvæ are most plentiful in April, June, and September, but the butterfly may be seen any month in the year" (J. Bombay N. H. Soc. 1890, 360; *id.* 1896, 570). Mr. G. F. Hampson enumerates the forms *Crocale*, *Catilla Gnoma*, and *Ilea*, as being found in the Nilgiris (J. A. S. Beng. 1888, 361). Mr. H. S. Ferguson "found *Crocale* and *Catilla* in abundance together, in Travancore, in the dry-weather, in the low country, and up to 2,000 feet on the Hills" (J. Bombay N. H. S. 1891, 444). Mr. W. C. Taylor records it as "very common at Khorda, in Orissa" (List, p. 14(1888). Mr. L. de Nicéville "obtained it in the neighbourhood of Calcutta, the larva feeding on *Cassia fistula*" (J. A. S. Beng. 1885, 50). Col. C. Swinhoe has

received each named form from the Khasia Hills (Tr. Ent. Soc. 1893, 309). Mr. H. J. Elwes records it as "not uncommon, in Sikkim, up to 3,000 feet from March to December; and I have it from Nepal and Bhotan" (Tr. Ent. Soc. 1888, 411). Mr. L. de Nicéville also records it from Sikkim, "being a common species at low elevations almost throughout the year. It is not, I think, seasonably dimorphic, the innumerable varieties which are found in both sexes occurring at all times" (Sikkim Gazetteer, 1894, 166). We possess specimens of the *Wet* and *Dry* form from Nepal, taken by the late General G. Ramsay. In Ceylon, Mr. F. M. Mackwood obtained it "principally in the lower and middle ranges. In the flights along the sea-coast, beginning generally in November, this species of *Catopsilia* forms about a third of the number, always travelling to the north; the flights lasting for days, thousands of them passing in an hour." Capt. Hutchinson found it "everywhere, in the Plains and Hills up to 6,000 feet, in forest and cultivated land; have taken them at almost all times. Flight strong and quick; sits in crowds on damp spots of roadside" (Lep. Ceylon, i. 122). Col. C. H. E. Adamson records it as being "common throughout Burma. Sometimes met with in immense quantities after the first shower of rain in April" (List, Burm. Butt. p. 41, 1897). Dr. N. Manders found it "the most abundant of the Pierinæ in the Shan States, and found everywhere" (Tr. Ent. Soc. 1890, 533). Mr. O. Limborg obtained it in "Upper Tenasserim, at Hatseiga, Nathoang, and Moolai, 3,000 to 6,000 feet" (P. Z. S. 1878, 837). Dr. J. Anderson obtained *Crocale* and *Catilla* at "Thaing, King Island, Mergui Archipelago, in January; and *Catilla* also at Elphinstone Island in March, and in Mergui, in December" (J. Linn. Soc. Zool. 1886, 49). We possess it from the Andaman and Nicobar Islands, taken by Mr. F. de Rœpstorff. Mr. H. Druce received it from "Siam" (P. Z. S. 1873, 355). Mr. J. H. Leech obtained it at Kukiang, C. China. Mr. H. Fruhstorfer has received it from "Siam, Annam, and Tonkin" (D. Ent. Zeit. 1902, 273). Mr. W. Distant obtained it from "Province Wellesley and Malacca, Malay Peninsula, and Penang" (Rhop. Malay. 296). In Sumatra Dr. L. Martin observed "*Crocale* to be the commonest species of *Catopsilia*: I have bred it, and *Catilla*, from found larvæ, and have failed to discover any differences in the larva and pupa. *Crocale* is enormously common, and occurs throughout the year. The males are fond of flowers, and especially of the *Hibiscus rosa-sinensis*. The larva feeds on the leaves of *Cassia florida*, and sometimes in company with *Cat. Pyranthe*, on *Cassia alata*. *Crocale* is far the commoner form, occurring on roads, near houses and gardens, and is never found in the forest. It sometimes appears in great numbers, in which case the larvæ are very destructive, as in January, 1893, near the Pœngi Estate, they destroyed in a short time a fine plantation of young iron-wood trees, *Cassia florida*, valued at least at \$3,000, by eating up all the leaves and suffocating the plants. All the grass, and every low

shrub near the plantation was covered with the pupæ, and after the butterflies had emerged, the whole place looked as if there was a heavy snow-storm in progress, the air being full of large flakes of snow. I took there many hundreds of both sexes, but amongst them was not a single *Catilla*." . . . " *Catilla* is found only in the forest, the males on forest roads on wet spots together with *Lycenidae* and *Papilioninæ*, but they form the larger number of the congregations, and often occur in such crowds that cart-horses get frightened on approaching one of these white spots on the road, which all at once flutters up into the air with an audible sound. If driven away from these favourite spots, they fly rapidly in Indian file up and down the forest roads, and fall in again on the same spot when the danger is passed. *Catilla* appears never to be a destructive insect as is *Crocale* at times" (J. As. Soc. Bengal, 1895, 490). We possess specimens of *Crocale* from Java, Borneo, and Formosa. It is also recorded from the Philippines, by Dr. Semper; from Kukiang, C. China, by Mr. J. H. Leech, and Hong Kong, by Commander J. Walker.

#### CATOPSILIA PYRANTHE.

Plate 577, figs. 1, 1a, ♂ ♀ (Wet); 1b, larva and pupa; 1c, d, ♂ ♀ (Dry); 1e, f, g, ♂ ♀ (Extreme Dry).

*Papilio Pyranthe*, Linnaeus, Syst. Nat. x. ed. p. 469 (1758); *id. Mus. Ulr.* p. 245 (1764); *id. Syst. Nat. xii. ed. p. 763* (1767)—*Wet form.*

*Colias Pyranthe*, Godart, Enc. Méth. ix. p. 97 (1819). Horsfield, Catal. Lep. Mus. E. I. Compy. p. 129 (1829).

*Callidryas Pyranthe*, Boisduval, Spéc. Gén. Lép. i. p. 611 (1836). Moore, Catal. Lep. Mus. E. I. Compy. i. p. 56, pl. 1, figs. 8, 8a, *larva* and *pupa* (1857). Butler, Catal. Lep. Fabr. p. 224 (1869); *id. Lep. Exotica*, i. p. 35, pl. 15, figs. 8, 9, 10, ♂ ♀ (1871).

*Catopsilia Pyranthe*, Moore, Lep. of Ceylon, i. p. 124, pl. 47, fig. 2, 2a, ♂ ♀ (1881). Swinhoe, Proc. Zool. Soc. 1884, p. 511; *id. Lc.* 1885, p. 139; *id.* 1886, p. 433; *id. J. Bombay N. H. Soc.* 1887, p. 279. Davidson and Aitken, Journ. Bombay N. H. Soc. 1890, p. 360; *id.* 1896, 570. de Nicéville, Journ. As. Soc. Bengal, 1885, p. 50; *id.* 1899, p. 211. Doherty, J. As. Soc. Beng. 1886, p. 135. Hampson, J. As. Soc. Beng. 1888, p. 361. Taylor, Batt. of Orissa, p. 14 (1888). Elwes, Tr. Ent. Soc. 1888, p. 411. de Nicéville, Sikk. Gazetteer, 1894, p. 166. Marsden, Tr. Ent. Soc. 1890, p. 538. Swinhoe, Tr. Ent. Soc. 1893, p. 308. Mackinnon, J. Bombay, N. H. S. 1898, p. 586.

*Catopsilia Pyranthe* (pt.), Butler, Ann. Nat. Hist. 1904, p. 414. de Nicéville, J. As. Soc. Bengal, 1895, p. 492. Fruhstorfer, D. Ent. Zeit. 1902, p. 271.

*Papilio Gnoma*, Fabricius, Syst. Ent. p. 828 (1776) ♂—*Extra Dry.*

*Catopsilia Gnoma*, Butler, Lep. Exotica, i. p. 43, pl. 16, figs. 1-4, ♂ ♀ (1871), *id. Ann. Nat. Hist.* 1888, p. 203. Moore, Lep. of Ceylon, i. p. 123, pl. 48, fig. 2, a, b, ♂ ♀, *larva* (1881); *id. Journ. Linn. Soc. Zool.* 1886, p. 49. Elwes, Trans. Ent. Soc. 1888, p. 411.

*Papilio Minna*, Herbst, Nat. Schmett. v. p. 74, pl. 89, fig. 1, 2 (1792)—*Wet.*

*Mancipium F. Murtia Minna*, Hübner, Samml. Exot. Schmett. plate, figs. 1, 2, ♂, 3, 4, ♀ (1806-16).

*Murtia Minna*, Hübner, Verz. bek. Schmett. p. 98 (1816).

*Catopsilia Minna*, Butler, Ann. Nat. Hist. 1888, p. 203.

*Papilio Philippina*, Cramer, Pap. Exot. iv. pl. 361, fig. C, D, ♀ (1781)—*Extra Dry.*

*Colias Philippina*, Hübner, Verz. bek Schmett. p. 99 (1816). Godart, Enc. Méth. p. 196 (1819). Horsfield, Catal. Mus. E. Ind. Compy. p. 130 (1829).

*Callidryas Philippina*, Boisd. Sp. Gén. Lép. i. p. 609 (1836). Moore, Catal. Lep. Mus. E. I. C. i. p. 56, pl. 12, figs. 8, 8a, *larva and pupa* (1857).

*Catopsilia Philippina*, Aurivillius, Kongl. Vet. Akad. Handl. 1882, p. 57. Swinhoe, P. Z. S. 1884, p. 511; *id. l.c.* 1885, p. 139; *id. 1886*, p. 432; *id. Journ. Bombay N. H. S.* 1887, p. 279.

*Callidryas Thisorella*, Boisd. Spéc. Gén. Lép. i. p. 609 (1836), ♂—*Dry.*

*Catopsilia Thisorella*, Swinhoe, P. Z. S. 1884, p. 511; *id. l.c.* 1885, p. 139; *id. Trans. Ent. Soc.* 1893, p. 309.

*Papilio Ilea*, Fabricius, Ent. Syst. Suppl. p. 421, ♂ (1778)—*Dry.*

*Catopsilia Ilea*, Moore, Lep. Ceylon, i. p. 124, pl. 47, figs. 1, 1a, b, ♂ ♀, *larva* (1881). Swinhoe, P. Z. S. 1885, p. 139; *id. J. Bombay Nat. Hist. Soc.* 1887, p. 279; *id. Tr. Ent. Soc.* 1893, p. 308.

*Callidryas Chryseis* (pt.), Butler, Catal. Fabr. Lep. B. M. p. 224 (1869). Distant, Rhop. Malay. p. 300 (1885). Adamson, List Butt. Burma, p. 41 (1897).

*Wet form* (figs. 1, 1a, ♂ ♀) = *Pyranthe*. Male. Upperside pale bluish-white. *Forewing* with a moderately broad black apical marginal band, which decreases narrowly hindward, and ends generally at lower median veinlet, its inner edge being more or less sinuous; a small linear black mark on lower discocellular veinlet. *Hindwing* with a very slightly indicated black point at marginal tip of the veins. Underside with the costal and apical area of *forewing*, and the entire *hindwing* pale olivescent-yellow, and numerously covered with short transverse slender indistinctly-defined grey strigæ; a small, slightly apparent pale spot on lower discocellular veinlet. *Forewing* with the posterior area bluish-white, its extreme edge furnished with the normal elongated tuft of fine silky hairs, and the *hindwing* above with the glandular patch of scales.

Female. Upperside bluish-white. *Forewing* with the black apical marginal band broader than in male, and terminating at posterior angle, the band inwardly accompanied by, or partly anteriorly-merged into, a subapical series of dentate lunules; the discocellular spot large, oval, or diagonal. *Hindwing* with a more or less slightly apparent marginal row of blackish-scaled lunular spots, or larger almost confluent spots. Underside similar to the male, the strigæ more distinct; the discocellular spot more distinct than in male, pale reddish with white centre, that on the *hindwing* sometimes accompanied by a very slightly indicated similar upper outer spot. Antennæ in both sexes pinkish-grey.

Expanse, ♂ ♀ 2 to  $2\frac{6}{10}$  inches.

*Dry form* (figs. 1, c, d, ♂ ♀) = *Thisorella*. Male. Upperside similar to *Wet form*, except that the *forewing* has the apical marginal band conspicuously narrower, and generally macular from below the apex, the discocellular spot small and short.

Underside also similar, the strigæ generally more distinct, the discocellular spot more prominent and white. Normal tuft, and glandular patch, similar.

Female. Upperside. *Forewing* with the outer band comparatively narrower than in female of *Wet* form, the subapical confluent lunules anteriorly restricted and less defined, the discocellular spot similar. *Hindwing* with a more or less slightly-apparent dentate dot at tip of the veins. Underside brighter yellow-tinted, and the strigæ more apparent. Both wings with the discocellular spot more distinctly defined, that on the *hindwing* always accompanied by a similar upper spot, and a small nacreous-centred ringlet within the upper end of the cell; a very slightly apparent upper subapical transverse series of pale reddish dentate lunules on *forewing*, and a curved discal series of similar lunules on the *hindwing*. Antennæ as in *Wet* form.

Expanse, ♂  $2\frac{6}{10}$ , ♀  $2\frac{2}{10}$  inches.

*Extreme Dry form* (figs. e, f, g, ♂ ♀). Larger than ordinary *Dry* form. Male. Upperside either bluish-white or olivescent-white. *Forewing* with a narrow black apical marginal band, which is macular from below the apex; the discocellular spot more or less slender. Underside pale olivescent-yellow, the strigæ more distinct than in ordinary *Dry* form, and the discocellular spot more prominent; a subapical lunular fascia on *forewing*, and a discal fascia on *hindwing* more or less slightly apparent.

Female. Upperside olivescent-white, and tinted outwardly with pale, olivescent-yellow. *Forewing* with the marginal band broader, and more dentate than in male, or macular from below the apex; discocellular spot larger than in ordinary *Dry* female. Underside. Both wings brighter olivescent-yellow than in male, the strigæ more apparent; the extreme marginal edge of wings red-tinted. *Forewing* with a prominent large single or duplex-reddish-centred discocellular spot, and distinct reddish upper discal dentate-lunular fascia. *Hindwing* with two (sometimes one only) prominent discocellular dark-red bordered nacreous centred spots, and a much larger similar spot within upper end of the cell, the discal series of dentate lunules also distinct.

Expanse, ♂  $2\frac{4}{10}$  to  $2\frac{8}{10}$ , ♀  $1\frac{8}{10}$  to  $2\frac{8}{10}$  inches.

**HABITAT.**—Western, Central, Eastern Himalayas; Upper and Lower Continental India; Ceylon; Burma; Tenasserim; Siam; Aunam; Malay Peninsula; Sumatra; Java; Borneo; Formosa; Hainan.

**LIFE HISTORY.**—“*Egg*.  $\frac{3}{4}$  line long; fusiform; attached to the leaf, on which larva feeds, by one end. Colour clear glossy-white. Solitary as regards position, several, however, under one leaf of *Cassia*.

**Larva.**—When hatched  $1\frac{1}{2}$  line long. Colour deep rich glossy-green; lateral line yellowish-white, bordered above by a black dotted line. The whole of the back

and head most closely and thickly dotted with raised black spots, giving the larva a rugose appearance; abdomen pale green, slightly dotted with black. Legs green. Head green, and very round in front. Stigmata black, circled with green. *After last moult.* Length 1 inch. Cylindrical, as after first moult, though a little darker. Feeds on *Cassia occidentalis*. Habits sluggish. Changed into chrysalis on August 28th. *Pupa.*—Green; angles marked with yellow lines.

*Imago.*—Emerged on September 5th. Very common in Lucknow" (Capt. H. L. Chaumette. MS. Notes, 1860).

Messrs. Davidson and Aitken, in their "Notes on the Butterflies of the N. Kanara District of Bombay, describe the larva as being "long, somewhat depressed, rough, green, with a white lateral line, and above it a black line, more or less conspicuous, formed by minute, flat, shining, black tubercles, being like a big specimen of *Terias Hecabe*. The pupa is much stouter, and the keel formed by the wing cases is much less pronounced. The normal colour is pale green, with a yellow lateral line. We have never found it on any plant except *Cassia occidentalis*. It habitually rests on the upperside, along the midrib, like almost all Pierine larvæ.

**DISTRIBUTION, HABITS, &c.**—In the N.W. Himalayas this species was taken by Capt. A. M. Lang, and also in the Plains. "Larva reared on *Cassia Tora*" (Ent. Mo. Mag. 1864, 103). Mr. P. W. Mackinnon records it as "not very common in Masuri during the rains, the dry-season form, *Gnoma*, even less so. In the Dehra Dun both forms are common in their respective seasons. The larva feeds in the Dun, on *Cassia Tora*, N. O. Leguminosæ" (J. Bombay N. H. S. 1898, 586). Mr. W. Doherty obtained it at "Bagheswar, Kali Valley, up to Dharchula, 2,000 to 4,000 feet, Kumaon" (J. As. Soc. Beng. 1886, 135). Col. C. Swinhoe records *Pyranthe* as being "common in Mhow, Central India, all the year round, and *Philippina* from September to April" (P. Z. S. 1886, 432). Col. Swinhoe also records "a few specimens of *Pyranthe* from Karachi, taken in March, May, June, and December; *Thisorella* being common from March to May, and *Philippina* from September to January" (l.c. 1884, 511), and "Pyranthe also common everywhere in Bombay and the Deccan, all the year round; *Thisorella* at Poona from November to June, Ahmednuggur, October to November; *Ilea* at Poona from November to June, Ahmednuggur, Sept. and October; and *Philippina* at Poona from October to April, Ahmednuggur, November; and Bombay, March, July, and October" (l.c. 1885, 139); in Karachi. "Pyranthe was common from May to August, *Ilea*, May and June; and *Philippina* from Sept. to January" (id. J. Bombay N. H. Soc. 1887, 279).

Messrs. J. Davidson and E. H. Aitken obtained and described the larva, as found in the Kanara District of Bombay. "The butterfly being common everywhere and all the year round. The only food-plant, as far as our present knowledge

goes, is *Cassia occidentalis*” (J. Bombay N. H. Soc. 1890, 360; 1896, 570). Mr. G. F. Hampson obtained it in the Nilgiris (J. A. S. Beng. 1888, 361). We possess male and female from Madras, reared from larvæ by the late Sir W. Elliot, feeding on *Cassia occidentalis* and *C. auriculata* in August and September. Mr. H. S. Ferguson records it as “common in the low country and the Hills, in Travancore” (J. Bomb. N. H. S. 1891, 444). In Ceylon, Mr. F. M. Mackwood found it “in all parts, but more numerous in the low country than in the upper. A few occur in the low country flights. Dr. Thwaites obtained and describes the larva and pupa; found on *Cassia fistula*” (Lep. Ceylon, i. 128). Dr. N. Manders notes “that as far as his observations in Ceylon go, the forms of *Pyranthe* are not dependent on season, but appear indiscriminately nearly throughout the year, those flying in the dry-season from February to April being a little smaller than those found during the rest of the year” (J. As. Soc. Beng. 1899, 211). Mr. W. C. Taylor cites it as “very common at Khorda in Orissa” (List, 14, 1888). Mr. L. de Nicéville notes it as being found in the neighbourhood of Calcutta (J. As. Soc. Beng. 1885, 50).

Col. Swinhoe has received *Pyranthe*, *Ilea*, *Thisorella*, and *Philippina* “from the Khasia Hills” (Tr. Ent. Soc. 1893, 308). Mr. H. J. Elwes records it as “common in Sikkim, up to 3,000 feet elevation, from March to December” (Tr. Ent. Soc. 1888, 411).

In Burma, observes Col. C. H. E. Adamson, “this is a very common insect throughout the year” (List, Burm. Butt. 41 (1897). Dr. N. Manders found it “abundant all over the Shan States, at all elevations” (Tr. Ent. Soc. 1890, 533). Dr. J. Anderson obtained it at “Thaing, King Island, and Mergui, in February and March” (J. Linn. Soc. Zool. 1886, 49). Mr. W. L. Distant records it from the Malay Peninsula (Rhop. Malay. p. 300). We possess specimens from Sumatra, Java, Borneo, Hainan, Formosa.

#### CATOPSILIA ALCYONE.

Plate 578, figs. 1, ♂, 1a, b, ♀ (*Wet form*).

*Papilio Alcyone*, Cramer, Pap. Exot. i. pl. 58, fig. A, B, C, ♂ ♂ (1779).

*Catopsilia Chryseis*, Butler, Trans. Linn. Soc. Zool. i. p. 551 (1877). Moore, Proc. Zool. Soc. 1877, p. 591. Wood-Mason and de Nicéville, J. As. Soc. Beng. 1881, p. 252. Moore, Lep. Ceylon, i. p. 125, pl. 48, figs. 3, 3a, ♂ ♀ (1881). Distant, Rhop. Malayana, p. 300, pl. 25, fig. 2, ♂ (fig. 1, ♀); *id.* pl. 26, fig. 20, ♀ (1885). Moore, Journ. Linn. Soc. Zool. 1886, p. 49.

*Callidryas Chryseis* (pt.), Butler, Cat. Fabr. Lep. B. M. p. 224 (1869).

*Catopsilia Chryseis* (pt.), Adamson, List Burm. Lep. p. 41 (1897).

*Catopsilia Pyranthe* (pt.), Semper, Reise Phil. Lep. p. 258 (1891). de Nicéville, Journ. As. Soc. Bengal, 1895, p. 492. Fruhstorfer, D. Ent. Zeit. 1902, p. 271.

*Wet form* (figs. 1, 1a, b, ♂ ♀). Male. Upperside bluish-white. Forewing with a black apical marginal band similar to, but broader throughout its length, and less

acutely-sinuated than in *Wet* form of *Pyranthe*; the discocellular spot small, slender. *Hindwing* with, or without, a minute point at tip of the veins. *Underside*. *Forewing* with the anterior half, and the entire *hindwing* pale olivescent-yellow, crossed between the veins by numerous pale greyish-ochreous strigæ. Both wings with a slightly-apparent small pale reddish discocellular spot. Posterior half of *forewing* bluish-white; veins of *hindwing* basally whitish.

Female. Upperside bluish-white. *Forewing* with the costal border from base black scaled, merging into the black apical marginal band, which is broader than in female *Dry* form of *Pyranthe*, having its upper portion to middle median veinlet entirely black, and including the subapical lunules which are present in the latter species; discocellular spot larger. *Hindwing* with a narrow, more or less macular, marginal band. *Underside* brighter yellow than in male, the strigæ more distinct, the submarginal lunular fascia slightly apparent. *Forewing* with the discocellular spot more distinct; the *hindwing* with two small pale-centred discocellular spots, and a similar spot within upper end of the cell.

*Expanse*, ♂  $2\frac{6}{10}$ , ♀  $2\frac{4}{10}$  to  $2\frac{6}{10}$  inches.

*Dry form*. Male. Upperside similar to *Wet* form. *Forewing* with the discocellular spot more distinct. *Hindwing* with slightly-apparent marginal narrow blackish-scaled spots. *Underside* similar to *Wet* form. Both wings with a more or less distinct small pale-centred reddish discocellular spot.

Female. Upperside bluish-white. *Forewing* with the marginal band as in *Wet* form, the anterior portion not having any subapical whitish interspaces; some specimens also show traces of black-scaled lunules from the middle median veinlet to the submedian vein; discocellular spot prominent. *Hindwing* with a black, broad marginal continuous band, and two or three inner upper-submarginal, less distinct partly-confluent lunules. *Underside* brighter yellow, the strigæ more apparent, the discocellular spots more distinct, and the submarginal lunular fascia more apparent.

*Expanse*, ♂ ♀,  $2\frac{6}{10}$  to  $2\frac{8}{10}$  inches.

**HABITAT**.—Ceylon?; Mergui, S. Tenasserim; Malay Peninsula; Penang; Sumatra; Billitong; Philippines.

**DISTRIBUTION**.—We possess a male from Capt. Hutchison, reputed to be from Ceylon (*vide* Lep. Ceylon, i. pl. 48, fig. 3); also both sexes from Mergui, taken by Dr. J. Anderson, and others from Malay Peninsula, Sumatra, and Billitong.

Of our illustration on Plate 578, figs. 1, 1a, b, ♂ ♀ are from Mergui specimens.

#### CATOPSILIA SCYLLA.

Plate 578, figs. 2, ♂, 2a, b, ♀.

*Papilio Sylla*, Linnæus, Cent. Inst. p. 20 (1763); *id. Mus. Ulr.* p. 242 (1764); *id. Syst. Nat.* xii. ed. p. 763 (1767). Johan. Ainoen. Acad. vi. p. 404 (1764). Cramer, Pap. Exot. i. pl. 12,

fig. C, D (1775). Sulzer, *Gesch. Ins.* p. 143, pl. 15, fig. 6 (1776). Meerburgh, *Afb. pl. 16*, fig. 5 (1775). Donovan, *Ins. Ind.* pl. 28, fig. 3 (1800).

*Colias Scylla*, Hübner, *Verz. bek. Schmett.* p. 99 (1816). Godart, *Enc. Méth. ix.* p. 95, pl. 14, fig. 3, ♂ (1819). Horsfield, *Catal. Lep. Mus. E. Ind. Compy.* p. 133, pl. 4, fig. 6, 6a, *larva* and *pupa* (1829).

*Callidryas Scylla*, Boisd. *Sp. Gén. Lép. i.* p. 631 (1836). Lucas, *Lep. Exot.* p. 80, pl. 40, fig. 1, ♂ (1845). Moore, *Catal. Lep. E. I. Compy. i.* p. 58, pl. 1, fig. 9, 9a, *larva* and *pupa* (1857). Butler, *Catal. Fabr. Lep. B. M. p. 220* (1869); *id. Lép. Exotica*, i. p. 31, pl. 12, figs. 5-8, ♂ ♀ (1870). Snellen, *Mid Sumatra, Lep.* p. 23 (1880).

*Catopsilia Scylla*, Aurivillius, *Kongl. Vet. Akad. Handl.* 1882, p. 55. Semper, *Reise Philip. Lep. i.* p. 257 (1891). Distant, *Rhop. Malayana*, p. 298, pl. 24, figs. 1, 2, ♂ ♀ (1885). de Nicéville and Martin, *J. As. Soc. Bengal*, 1895, p. 493. Fruhstorfer, *D. Ent. Zeit.* 1902, p. 275; *id. Soc. Ent.* 1903, p. 25.

*Papilio Cornelius*, Fabr. *Mant. Ins. ii.* p. 21 (1787).

*Callidryas Gorgophone*, Doubleday, *Gen. D. Lep. pl. 9*, fig. 2 (*nec* Boisd.).

Male. Upperside. *Forewing* olivescent-white; costal margin basally, slenderly, and apex and outer margin broadly, black, its inner-edge from the first subcostal branch sinuous; a small blackish-scaled discocellular spot more or less slightly apparent. *Hindwing* bright ochreous-yellow, the abdominal margin being pale yellow; with a more or less slightly apparent, or, a distinct marginal row of small blackish-scaled dentate spots. Underside pale yellowish-ochreous. *Forewing* with the posterior margin broadly white; a single, small, or, a larger duplex, reddish or blackish-scaled discocellular ringlet spot, and a discal upper series of more or less defined black-scaled dentate lunules. *Hindwing* with a small upper discal ringlet-spot, a small spot at base of the cell, and one above it, also two similar smaller spots below the junction of lower median veinlet; also a discal transverse zigzag series of black-scaled lunules, also a slight similar-scaled tip at end of the veins.

Female. Upperside. *Forewing* olivescent-white, with a somewhat broader, similar costal and outer black band, the latter inwardly accompanied by a more or less defined black submarginal dentate-lunular fascia, the anterior portions of which are partly confluent with the outer band; the costal band sometimes extending outward broadly towards the discocellular; spot similar to that in *Crocale*; a slightly-apparent, or well-defined, discocellular mark. *Hindwing* paler ochreous-yellow, and the blackish marginal spots larger than in male, and a more or less apparent series of blackish-scaled submarginal lunules. Underside brighter yellow than in male. *Forewing* with a similar but more prominent duplex discocellular spot and submarginal lunules, than in male. *Hindwing* also with a duplex discocellular spot, also a spot within base of the cell, two below it, and one above it, all more defined than in the male.

Expanse, ♂  $2\frac{4}{10}$  to  $2\frac{6}{10}$ , ♀  $2\frac{6}{10}$  inches.

LARVA and PUPA.—Described and figured by Dr. Horsfield (*l.c.*).

HABITAT.—?S. India; S. Shan States, Burma; Malay Peninsula; Sumatra; Java; Luzon.

DISTRIBUTION.—We possess two coloured drawings of male from the late S. N. Ward's Malabar "Notes" without specified locality. Fabricius refers his *P. Cornelius* as having come from "Tranquebar." Col. C. T. Bingham has a female from the S. Shan States, Burma. We have verified it from the Malay Peninsula, Sumatra, and Java. Dr. Semper records it from Luzon, Philippines.

INDO-CHINA SPECIES.—*Catopsilia Chryseis* (Pap. *Chryseis*, Drury, Illust. Exot. Ent. i. pl. 12, figs. 3, 4, ♂ (1770). Walker, Tr. Ent. Soc. 1895, p. 464. Call. *Chryseis*, Butler, Lep. Exot. i. p. 5, pl. 15, figs. 4-7 ♂ ♀ (1871). *Syn.* Pap. *Nephthe*, Fabricius, Ent. Syst. iii. i. p. 190 (1793). Pap. *Pyranthe*, Donov. Ins. China, pl. 32, fig. 1, ♂ (1798). Wallace, P.Z.S. 1866, p. 257. Catop. *Pyranthe* (pt.) Fruhstorfer, D. Ent. Zeit. 1902, p. 271. Comparatively longer than *Alcyone*. Female differs from it in the forewing having the marginal band anteriorly traversed by white interspaces.

HABITAT.—S.E. China; Hong Kong; Formosa.

#### Genus IXIAS.

*Ixias*, Hübner, Verz. bek. Schmett. p. 95 (1816). Butler, Cistula, Entom. i. pp. 37, 48 (1870). Moore, Lep. of Ceylon, i. p. 125 (1881). Distant, Rhop. Malayana, p. 309 (1885). Schatz, Exot. Schmett. p. 73 (1886). Watson, Journ. Bombay Nat. Hist. Soc. 1894, p. 502. Kirby, Allen's Nat. Libr. Lep. ii. p. 199 (1896). Butler, Ann. Nat. Hist. 1898, p. 133. Bingham, Fauna of Brit. India, Butt. ii. p. 192 (1907).

*Pontia* (part), Horsfield, Catal. Lep. Mus. E.I.C. p. 142 (1829).

*Thesrias* Boisduval, Spéc. Gén. Lep. i. p. 590 (1836). Doubleday, Gen. D. Lep. p. 60 (1847).

A genus of "orange tips" which with *Hebomoia* practically replaces *Callosune* in the Indo-Malayan Region, and extends to some of the Austro-Malayan Islands, though in India and Ceylon the ranges of these three genera overlap.

Captain E. Y. Watson, in a paper published in the Journal of the Bombay Natural History Society, 1894, pp. 489-527, puts all the Indian members of the genus *Ixias* into three species, making all the other described forms, varieties, seasonal, or local forms, of one or other of these three species (his first species, *Venatrix* Wallace, is not Indian but from Java). We agree with Dr. A. G. Butler as expressed in the Annals and Magazine of Natural History, 1898, p. 136, that it is difficult to comprehend Captain Watson's meaning, because, as is shown in this work, all the species herein treated with, have their own seasonal forms, and if it were for no other reason, for the sake of convenience, each of these species or races, or forms (or whatever one may like to call them) must have a name; no doubt they all originated from

one common ancestor and have now developed into easily distinguishable races in the various localities they inhabit. Unfortunately Colonel C. T. Bingham in the Fauna of British India has to a great extent followed Captain Watson, but he does discriminate certain groups and races, and we agree with Dr. Butler that if a thing is distinct it ought not to have the same name as that from which it is admitted to be distinct, because otherwise, every time it is referred to, it would have to be described, and it is so much more simple and convenient to refer to it by its recognised name.

IMAGO.—Wings ample, broad. Forewing short, sub-triangular; costa much arched from the base, exterior margin slightly uneven and almost erect; costal vein extending to two-thirds of the margin; first sub-costal branch emitted at one-third, and second at one-eighth before end of the cell, third trifid, the fifth from beyond end of the cell; the cell very broad and extending to fully half the wing; discocellular veinlets outwardly oblique, both concave, upper shortest, the radial emitted from their angle; middle median veinlet emitted at one-sixth, and lower at one-third before end of the cell; sub-median vein much recurved. Hindwing oboconical, short; exterior margin oblique, uneven, slightly angular before its lower end; pre-costal vein slender; costal vein curved towards the end; first sub-costal emitted at one-fourth before end of the cell and much curved; discocellulars very oblique, upper shortest, lower recurved, radial from their angle; cell broad; middle median branch curved, emitted at one-sixth, and lower at one-third before end of the cell; submedian vein slightly curved; internal vein recurved. Body stout; thorax and head hairy; palpi projecting slightly beyond the head, hairy beneath, third joint short; legs slender; antennæ terminating in a gradually compressed club.

LARVA.—August 8th, 1864. Wangtoo, N.W. Himalaya. Food plant *Capparis obovata*. Head small, second, third and fourth segments largest; other segments diminishing to twelfth, which is smallest, thus giving a tapering form. Colour uniform pale transparent yellowish-green. On each of fourth to eleventh segments are eight small inconspicuous reddish spots, which are disposed on each segment above the legs; legs and prolegs pale green. A considerable number of various ages and sizes were feeding together on a branch of *Capparis*; one or two bushes were eaten almost bare of leaves. A few empty pupæ were on the twigs, and also in the crevices of the rocks on which grew the bushes. The largest larvæ were  $1\frac{2}{9}$  inches in length, and one of these, on capture, began to spin up for pupa.

PUPA.—August 10th. Boat-shaped; very much arched and very pointed, especially at the anterior extremity, which is produced into a sinuous snout. Colour pale ochreous-yellow, indistinctly very faintly speckled; a dark narrow stripe down the back, which is slightly keeled along this stripe; a faint stripe along each side from the posterior extremity up to the wings; segments movable.

IMAGO emerged on August 25th a female of *Pyrene* (Captain A. M. Lang, ms. Notes).  
Type, PYRENE.

## IXIAS PYRENE.

Plate 579, figs. 1, 1a, 1b, ♂ ♀ (Wet-season Brood), 1c, 1d, ♂ ♀ (Dry-season Brood), 1e, 1f, 1g, ♂ ♀ (Extreme Dry-season Brood).

*Papilio Pyrene*, Linnaeus, Mus. Ulr. p. 24 (1764). Cramer, Pap. Exot. ii, pl. 125, figs. A, B (1779). Aurivillius, Kongl. Svenska Vetens.-Akad. Handl. 1882, p. 54.

*Thesias Pyrene*, Boisduval, Sp. Gen. p. 593 (1836). Wallace, Trans. Ent. Soc. 1867, p. 394.

*Ixias Pyrene*, Butler, Proc. Zool. Soc. 1871, p. 253. Doherty, Journ. As. Soc. Bengal, 1885, p. 136. Watson (part), Journ. Bo. Nat. Hist. Soc. 1897, p. 669. de Nicéville, Journ. Bo. Nat. Hist. Soc. 1898, p. 152, pl. AA, figs. 29, 30. Fruhstorfer, Iris, 1902, p. 205. Bingham (part), Fauna of Brit. India, Butt. ii, p. 193 (1907).

*Papilio Euippe*, Drury, Ill. Exot. Ent. Ins. i, pl. 5, fig. 2, ♂ (1773).

*Papilio Rhexia*, Fabricius, Syst. Ent. p. 476 (1775).

*Papilio Pirithorus*, Fabricius, l.c. p. 483, ♀ (1775).

*Papilio Sesia*, Fabricius (part), Gen. Ins. p. 257 (1777).

*Papilio Ænippe*, Cramer, Pap. Exot. ii, pl. 105, figs. C, D (1779).

*Ixias Anexibia*, Hübner, Verz. bek. Schmett., p. 95 (1816).

*Ixias Familiaris*, Butler, Trans. Ent. Soc. 1874, p. 432.

*Ixias Tonkiniana*, Fruhstorfer, Iris, 1902, p. 297, Soc. Ent. 1902, p. 42.

## Wet-season Brood (Plate 579, figs. 1, 1a, 1b, ♂ ♀).

Male. Upperside, ground colour sulphur-yellow. *Forewing* with the base of costa and transverse anterior obliquely black and subapically crossed by a broad orange-red fascia traversed by black veins, outer edge of the fascia being scalloped and its inner edge more or less brokenly and broadly occupying the end of the cell. *Hindwing* with a broad black outer marginal band. Underside yellow. *Forewing* with the basal half white. Both wings with the yellow area sparsely flecked with delicate indistinctly defined grey strigæ, these latter being more apparent marginally; a more or less defined small blackish discocellular mark; also in the forewing is a small slightly-indicated blackish spot at the posterior angle.

Female. Black apically, and traversed obliquely-outward by a broad white irregular-shaped sub-apical fascia; the basal area greyish-black, decreasing more or less to greyish-white along middle of the posterior margin. *Hindwing* with a broad greyish-black outer marginal band, which is broader than in male. Underside similar to the male, but of a darker yellow colour. *Forewing* with an elongated broad irregular greyish-black oblique patch extending from below the cell to posterior angle.

Expanse, ♂ ♀  $2\frac{1}{2}$  to 3 inches.

## Dry-season Brood (Plate 579, figs. 1c, ♀, 1d ♂.)

Male. Upperside similar to *Wet* form. *Hindwing* with the marginal band somewhat narrower. Underside similar to *Wet* form; the discocellular spot more distinct. *Hindwing* also with a transverse discal series of decreasing ocellate spots.

Female. Upperside similar to *Wet* form except the forewing is more broadly whiter posteriorly, and the marginal band of the hindwing narrower. Underside similar to male; the forewing with the patch at posterior angle shorter and generally accompanied by an upper discal series of indistinct spots.

Expanse, ♂ ♀  $2\frac{1}{2}$  to  $3\frac{3}{4}$  inches.

Extreme Dry-season Brood (1e, 1g, ♀, 1f, ♂).

Male. Upperside similar to the ordinary *Dry* form, except that the black band on the forewing and the marginal band on the hindwing are narrower, the latter macular, and more anteriorly restricted, and sometimes absent. Underside similar, the strigæ and ocelli more distinct.

Female. Similar to the ordinary *Dry* form. *Forewing* with the subapical white fascia generally narrower, and the posterior area more broadly white. *Hindwing* with the marginal band as in the male. Underside with brighter yellowish area than in the ordinary *Dry* form, the markings similar.

Expanse, ♂ ♀ 2 to  $2\frac{1}{2}$  inches.

HABITAT.—N.W. Himalayas, Burma, Annam, Tonkin, China.

DISTRIBUTION.—We possess examples from Simla, Sikkim, Assam, Bhootan and Mandalay; there are several examples from China in the British Museum; it does not appear to occur in central or upper or western China. Leech makes no mention of any species of *Ixias* in his Butterflies of China, Japan, etc. There are many examples in Colonel Swinhoe's collection from Tonkin and Annam, received from Fruhstorfer as *Tonkiniana* which can in no way be separated from Indian examples.

Note in the type specimen of *Ixias Pyrene* by Professor Aurivillius:—

“The specimen of *Papilio Pyrene* named by Linnæus in *Mus. Ulricæ*, p. 241 (1764), does not now exist. In 1803 King Gustavus IV. Adolphus made a gift of the Cabinet of Louise Ulrica to the University of Upsala, of which Thunberg made a List, but in this List *Pyrene* does not figure, so it was already then spoiled or lost, and Professor Aurivillius (Kongl. Svenska Vetens.-Akad. Handl. 1882, p. 54) has treated it only by the description made by Linnæus.” (Professor Aurivillius in letter from Dr. F. A. Bergstedt, Librarian, Kongl. S. Vet.-Akad. Bibliotek; Stockholm, March 8th, 1907).

#### IXIAS SATADRA.

Plate 580, figs. 1, 1a ♂ ♀ (Wet-season Brood), 1, b, ♂ (Intermediate Form), 1c, 1d (Dry-season Brood), 1e, 1f, 1g (Extra Dry-season Brood).

*Ixias Satadra*, Moore, Ann. Mag. Nat. Hist. 1877, p. 50, ♂. Waterhouse, Aid, ii. pl. 128, fig. 1 ♂ (1883) Butler, Ann. Mag. Nat. Hist. 1898, p. 139.

*Ixias Wattii*, Butler, Proc. Zool. Soc. 1880, p. 151, pl. 15, fig. 1 (Wet).

*Ixias Pygmæa*, Moore, Proc. Zool. Soc. 1882, p. 254, pl. 12, fig. 1, ♂ (Extra Dry).

*Thestias Pirenassa*, var. A, Wallace, Trans. Ent. Soc. 1867, p. 395 (Extra Dry).

*Ixias Pyrene* (part), Bingham, Fauna of Brit. India, Butt. ii. p. 193 (1907).

Wet-season Brood (Plate 580, figs. 1, 1a, ♂ ♀).

Male. Upperside pale olivescent-yellow, the base obscured by dusky-grey scales. *Forewing* with the orange sub-apical fascia somewhat narrower than in *I. frequens*, its upper discocellular portion larger and prominent, its inner black border broad. *Hindwing* with a broad black marginal band, which is more or less macularly continuous, or slightly broken and macular. Underside pale yellow. Both wings with a very slightly-defined small discocellular spot, and two medial-discal obscure pale orange spots on the *hindwing*.

Female. Upperside white, the base obscured by dusky-grey scales. *Forewing* with the apical half black, its inner border broad, the sub-apical fascia white, and crossed by two lower black spots. *Hindwing* with a moderately broad black marginal irregular-edged band. Underside white with a few apically-disposed slightly-defined dusky slender strigæ, a blackish discocellular spot, lower discal spots, and an elongated patch from the posterior angle. *Hindwing* with slightly-defined outwardly-disposed slender dusky discal strigæ, a small discocellular spot, two somewhat angled medial-discal spots, and a similar costal spot.

Expanse, ♂  $2\frac{1}{2}$  to  $2\frac{3}{4}$ , ♀ 2 inches.

Intermediate Form (Plate 580, fig. 1b, ♂).

Male. Upperside pale yellow, tinged with green at base and on the costa. *Forewing* with a broad black apical area occupying more than an oblique half of the wing, and enclosing a sub-apical narrow curved orange-red fascia crossed by black veins, the lower veins being broadly black speckled along their edges, and a transverse series of black speckles across the middle of the lower half of the fascia, thus forming a slightly distinct transverse streak. *Hindwing* with a somewhat broad black marginal maculated band. Underside clear yellow; a marginal black dot at end of the veins. *Forewing* with a distinct black discocellular spot, an outer transverse discal small black-speckled patch at the posterior angle. *Hindwing* with a less apparent discocellular spot, and a transverse discal series of yellowish-brown spots, the anterior being most prominent.

Expanse, ♂  $2\frac{1}{4}$  inches.

Dry-season Brood (Plate 580, figs. 1c, 1d, ♂ ♀).

Male. Upperside similar to *Wet* form. Underside also similar to *Wet* form, except that the *forewing* has a small blackish patch at the posterior angle, and on the *hindwing* there is a transverse series of discal dusky-speckled white-centred spots.

Female. Upperside pale yellow. Both wings with similar markings as in the *Wet* form. Underside also similar to the *Wet* form, with all the markings less defined.

Expanse, ♂ ♀  $2\frac{1}{2}$  inches.

Extreme Dry-season Brood (Plate 580, figs. 1e, 1f, 1g, ♂ ♀ = *Pygmæa*).

Male. Upperside. *Forewing* similar to the ordinary *Dry* form, except that the black inner border of the orange fascia is narrower, and the orange discocellular spot is generally smaller, or sometimes absent. *Hindwing* with more or less slightly-defined dusky, or obsolescent upper marginal decreasing dentate spots. Underside brighter yellow than in the ordinary *Dry* form. *Forewing* with distinct upper discal transverse dusky-edged white-centred spots. *Hindwing* with a more or less complete transverse discal series of white-centred spots, those medially-disposed being the largest.

Female. Upperside similar to ordinary *Dry* form, except that the sub-apical fascia is yellower, and the *hindwing* has the marginal band defined by more or less slight dusky dentate decreasing portions, or these are obsolescent. Underside with the transverse discal series of white-centred spots, as in the male, but more distinctly defined.

Expanse, ♂ 2 to  $2\frac{1}{2}$ , ♀  $2\frac{1}{2}$  inches.

HABITAT.—Western Himalayas.

DISTRIBUTION.—The type of *Satadra* came from Simla, the type of *Pygmæa* from Kangra, Butler gives the locality for *Watti* as Bengal, but that may mean anything; it certainly never came from Bengal proper. We have examples from Campbellpore and Rawul Pindi taken by Colonel Yerbury, and several examples from Kulu received from Mr. Graham Young.

#### IXIAS KANSALA.

Plate 581, figs. 1, 1a, ♂ ♀ (Wet-season Brood), 1b, 1c, ♂ ♀ (Dry-season Brood), 1d, ♀ (Extra Dry-season Brood).

*Ixias Kansala*, Moore, Annals Nat. Hist. 1877, p. 49, ♂ ♀ (Dry Form). P.Z.S. 1882, p. 254. Butler (part), Ann. Mag. Nat. Hist. 1898, p. 140.

*Ixias Pyrene* (part), Bingham, Fauna of Brit. India, Butt. ii. p. 193 (1907).

Wet-season Brood (Plate 581, f. 1, 1a, ♂ ♀).

Male. Upperside pale yellow. *Forewing* with the apical half black, crossed by a broad oblique sub-apical pale orange-red fascia, intersected by distinctly-defined black crossing veins, its inner edge bordered by black and encompassing a small orange spot at the upper end of the cell, cilia pale orange. *Hindwing* with a

moderately broad black marginal band with irregular inner edge. Underside, both wings uniformly pale yellow.

Female. Upperside white. *Forewing* with the apical half black, crossed by a white sub-apical fascia with a series of three black spots, its inner border being narrowly black medially, broad across end of cell and at its posterior end. *Hindwing* with a black moderately broad marginal band, similar to the male. Underside very pale yellow. *Forewing* with the basal area white; a small blackish discocellular spot, an indistinctly-defined transverse discal series of small dusky spots, and a more distinct patch at the posterior angle. *Hindwing* with some very indistinct dusky transversely-disposed slender strigæ, a very small discocellular spot, and a transverse upper discal series of three or four dusky, somewhat ocellate spots, the upper one being costal.

Expanse, ♂ 2, ♀  $1\frac{3}{4}$  to 2 inches.

Dry-season Brood (Plate 581, figs. 1b, 1d, ♂ ♀ [typical]).

Male. Upperside paler yellow than in *Wet* form. *Forewing* similar, except that the inner border of the orange sub-apical fascia is narrower throughout. *Hindwing* without any marginal band, having only a few blackish speckles at the anterior angle. Underside brighter yellow than in the *Wet* form. *Forewing* with an indistinct discocellular small blackish-speckled spot and two or three sub-apical spots. *Hindwing* with traces of several very indistinct slender dusky strigæ; a small blackish-speckled ocellate spot on anterior margin, and two similar medial-discal spots below it.

Female. Upperside pale yellow. *Forewing* with the sub-apical fascia pale orange, tinted on its lower portion, the lower portion having a series of four black spots, the upper portion inwardly bordered by a broad black oblique discocellular bar crossing end of the cell, the interspace between this and the lowest black spot being indistinctly marked by a few black speckles. *Hindwing* as in the male. Underside similar to the *Wet* form. *Forewing* with the discocellular spot more prominent, and the transverse discal row of dusky spots anteriorly with whitish centres. *Hindwing* with the discal spots also whitish centred.

Expanse, ♂  $1\frac{3}{4}$  to 2, ♀ 2 inches.

Extreme Dry-season Brood (Plate 581, figs. 1c, ♀).

Female. Upperside white. *Forewing* with the sub-apical fascia white, its transverse spots smaller and less prominent, the cell bar less prominent and the continuing lower edge slightly blackish-speckled. Underside paler coloured than ordinary *Dry* form, the markings similar.

Expanse, ♀  $1\frac{1}{2}$  to  $1\frac{3}{4}$  inches.

HABITAT.—Western Himalayas.

DISTRIBUTION.—The type came from Kansala; we have it from the Punjab (Horne) and from Umbala (Lang).

### IXIAS DHARMSALÆ.

Plate 582, figs. 1, 1a, ♂ ♀ (Wet-season Brood), 1b, 1c, ♂ ♀ (Intermediate Form), 1d, 1e, ♂ ♀ (Dry-season Brood), 1f, 1g, ♂ ♀ (Extreme Dry-season Form).

*Ixias Dharmasalæ*, Butler, Proc. Zool. Soc. 1880, p. 150, pl. 15, figs. 8, 9, ♂ ♀ (Dry Form), Swinhoe, P.Z.S. 1885, p. 143.

*Ixias Dharmasalæ*, Butler (part), Ann. Mag. Nat. Hist. 1898, p. 139.

*Ixias Colaba*, Swinhoe, Proc. Zool. Soc. 1885, p. 142, pl. 9, fig. 6, ♂ (Wet Form).

*Ixias Jhoda*, Swinhoe, l.c. p. 149, pl. 9, figs. 3, 4, ♂ ♀ (Extreme Dry Form).

*Ixias Pyrene*, Bingham (part), Fauna of Brit. India, Butt. ii. p. 193 (1907).

Wet-season Brood (Plate 582, figs. 1, 1a, 3, ♀ = Colaba).

Male. Larger than *Kansala*. Upperside pale yellow. *Forewing* with the orange fascia broader than in the *Wet* form of *Satadra*, and its black inner border conspicuously narrower throughout. *Hindwing* with the marginal band also somewhat narrower. Underside pale yellow. Both wings unmarked, or with slight traces of a small dusky discocellular spot.

Female. Upperside white, or very faintly yellow-tinted. *Forewing* with the apical half black, the base densely grey-scaled; sub-apical fascia white, its transverse black spots somewhat large. *Hindwing* with the marginal band broad. Underside pale yellow, the outer strigæ more visible. *Forewing* with the discocellular dusky-black mark prominent and large, the transverse discal spots and patch at the posterior angle distinct. *Hindwing* with a small discocellular spot, and two very indistinct ordinary medial-discal and one costal speckled spot.

Expanse, ♂ 2 to  $2\frac{1}{2}$ , ♀  $2\frac{1}{4}$  to  $2\frac{1}{2}$  inches.

Intermediate Form (Plate 582, figs. 1b, 1c, ♂ ♀).

Male. Upperside. *Forewing* similar to the *Wet* form, except that the black inner border to the orange fascia is somewhat narrower. *Hindwing* with the marginal band also somewhat narrower. Underside similar to the *Wet* form, except that there are a few outwardly disposed slight dusky strigæ, the discocellular spot present, the *forewing* showing faint traces of small upper-discal spots, and the *hindwing* with two dusky medial-discal spots, and a costal spot.

Female. Upperside very faintly tinted with pale yellow. *Forewing* similar to the *Wet* form, the black inner border to the sub-apical fascia slightly narrower.

*Hindwing* with the marginal band slightly narrower and somewhat macular. Underside similar to the *Wet* form, the markings somewhat more distinct.

Expanse, ♂ ♀ 2 to  $2\frac{1}{2}$  inches.

Dry-season Brood (Plate 582, figs. 1d, 1e, ♂ ♀, typical).

Male. Upperside similar to Intermediate form, except that the band on the *hindwing* is decreasingly narrower and macular. Underside brighter yellow; markings more distinct, the *hindwing* having a complete discal series of spots, the two or sometimes three medial-discal and the one costal spot being white-centred.

Female. Upperside pale yellow-tinted, occasionally pure white. *Forewing* with the sub-apical fascia brighter orange. *Hindwing* with the marginal band moderately narrow. Underside brighter yellow than in the Intermediate form, the strigæ more distinct, and the markings more strongly developed.

Expanse, ♂ ♀ 2 to  $2\frac{1}{2}$  inches.

Extreme Dry-season Brood (Plate 582, figs. 1f, 1g, ♂ ♀ = Jhoda).

Male. Somewhat smaller than the *Dry* form. Upperside pale yellow. *Forewing* similar, except that the black inner border to the orange fascia is more or less narrower throughout. *Hindwing* with either three or four very slightly-defined upper marginal dusky-scaled decreasing spots, sometimes the wing is entirely unmarked. Underside similar to the *Dry* form except that both wings are yellower, the strigæ more distinct, and the transverse discal markings more developed.

Female. Upperside; ground colour white with the subapical fascia of the *forewing* also white, or very pale yellow, or the ground-colour throughout is uniformly pale yellow, including the subapical fascia. *Hindwing* with a marginal row of decreasing more or less slightly-defined dusky spots. Underside darker yellow than in the *Dry* form, the strigæ more distinct and the transverse discal spots more developed.

Expanse, ♂ ♀  $1\frac{3}{4}$  to  $2\frac{1}{4}$  inches.

HABITAT.—From Dharmasala, southwards to Bombay.

DISTRIBUTION.—The type came from Dharmasala; *Colaba* and *Jhoda* from Bombay, where the latter is very common. Colonel Swinhoe took the *Wet* form (*Colaba*) in Bombay in June and July, and the Extreme *Dry* form (*Jhoda*) in great numbers from October to March; we have it also from Deesa, Mhow, Depalpur, Alibagh, Maldah and Belgaum, and also typical *Dharmasalæ* (the *Dry* form) in both sexes from Bombay taken in December.

## IXIAS PIRENASSA.

Plate 583, figs. 1, 1a, 1b, 1c, ♂ ♀ (Wet-season Brood), 1d, 1e, 1f, 1g, ♂ ♀ (Dry-season Brood), 1h, 1i, 1j, 1k, ♂ ♀ (Extreme Dry-season Brood).

*Thesias Pirenassa*, Wallace, Trans. Ent. Soc. 1867, p. 395, pl. 9, f. 4, ♂ (Dry Form).

*Ixias Pirenassa*, Butler (part), Ann. Mag. Nat. Hist. 1898, p. 140.

*Ixias Pyrene*, Bingham (part), Fauna of Brit. India, Butt. ii. p. 193 (1907).

Wet-season Brood (Plate 583, figs. 1, 1a, 1b, 1c, ♂ ♀).

Male. Upperside yellow. *Forewing* with the orange subapical fascia moderately broad, its black inner border narrow, the base of costal margin blackish scaled. *Hindwing* with a broad black marginal band. Underside pale yellow unmarked.

Female. Upperside white. *Forewing* with the subapical fascia white, its black inner border irregular; the base of the costa dusky-grey scaled. *Hindwing* with the marginal band broad. Underside pale yellow. *Forewing* with a slightly defined dusky discocellular spot, transverse discal spots and a patch at posterior angle. *Hindwing* with slightly defined costal spot, and discal spots with whitish centres.

Expanse, ♂ 2 to  $2\frac{1}{2}$ , ♀ 2 inches.

Dry-season Brood (Plate 583, figs. 1d, 1e, 1f, 1g, ♂ ♀).

Male. Upperside. *Forewing* similar to *Wet* form. *Hindwing* with the marginal band narrower than in that form. Underside. *Forewing* with a small blackish discocellular spot, and transverse discal spots. *Hindwing* with a small discocellular spot, and a discal series of spots, the costal and two medial-discal being the largest and white-centred.

Female. Upperside pale yellow. *Forewing* with the subapical fascia orange, its black inner border irregular. *Hindwing* with a broad marginal band. Underside brighter yellow than in the *Wet* form. Both wings with the markings more developed than in the *Wet* form, the discal spots being whiter centred.

Expanse, ♂ ♀ 2 to  $2\frac{1}{2}$  inches.

Extreme Dry-season Brood (Plate 583, figs. 1h, 1i, 1j, 1k, ♂ ♀).

Male. Upperside. *Forewing* similar to the ordinary *Dry* form, the black inner border to the orange fascia somewhat broader. *Hindwing* with the marginal band narrower and macular. Underside paler yellow than in the ordinary *Dry* form. Both wings slightly flecked with strigæ. *Forewing* with the discocellular spot larger and the discal spots on both wings much less apparent.

Female. Upperside white. *Forewing* with the subapical fascia pale yellow, its black inner border medially very narrow. *Hindwing* with a slightly-defined narrow dusky upper marginal decreasing somewhat-macular band. Underside very pale yellow. *Forewing* with the discocellular spot and transverse discal spots more distinct

than in the male. *Hindwing* with the discal spots defined by white centres, the medial being broadly bordered by a brownish-grey patch.

Expanse, ♂ 2, ♀  $1\frac{3}{4}$  inches.

HABITAT.—Eastern Provinces.

DISTRIBUTION.—Taken by Mr. Hutchinson in the forest lands, February and August.

#### IXIAS FREQUENS.

Plate 584, figs. 1, 1a, ♂ ♀ (Wet-season Brood), 1b, 1c, ♂ ♀ (Extreme Wet-season Brood), 1d, 1e, ♂ ♀ (Dry-season Brood), 1f, 1g, ♂ ♀ (Extreme Dry-season Brood).

*Ixias Frequens*, Butler, Proc. Zool. Soc. 1880, p. 150, pl. 15, figs. 6, 7, ♂ ♀ (Wet Form). Butler (part), Ann. Mag. Nat. Hist. 1898, p. 138.

*Ixias Gauduca*, Moore, Journ. As. Soc. Bengal, 1884, p. 44, ♂ ♀ (Extreme Dry Form). de Nicéville, Journ. As. Soc. Bengal, 1885, p. 50.

*Ixias Alana*, Swinhoe, Ann. Mag. Nat. Hist. 1890, p. 357, ♂ ♀.

*Ixias Pierenassa* (var. B.), Wallace, Trans. Ent. Soc. 1867, p. 395, ♂.

*Iris Pyrene*, Bingham (part), Fauna of Brit. India, Butt. ii. p. 193 (1907).

Wet-season Brood (Plate 584, figs. 1, 1a, ♂ ♀).

Male. Upperside pale yellow. *Forewing* with the subapical orange fascia slightly broader than in the *Wet* form of *Satandra*, its black inner border somewhat narrower throughout. *Hindwing* with the black marginal band broader and continuous. Underside yellow, unmarked, or with faint traces of a very small discocellular spot, and sometimes discal dusky spots on the hindwing.

Female. Upperside pale yellow. *Forewing* with the subapical fascia somewhat narrow, its black inner border irregular. *Hindwing* with its marginal band broad. Underside yellow. *Forewing* with a dusky-blackish discocellular spot, transverse discal spots, and a patch at the posterior angle. *Hindwing* with a slightly-defined small discocellular spot, and slight discal spots.

Expanse, ♂ ♀ 2 to  $2\frac{1}{2}$  inches.

Extreme Wet-season Brood (Plate 584, figs. 1b, 1c, ♂ ♀).

Male. Upperside pale yellow. *Forewing* with the black inner-border of the orange fascia somewhat broader than in the *Wet* form, and the base of costa blackish scaled. *Hindwing* with the marginal band also broader. Underside. Both wings with faintly defined-dusky strigæ. *Forewing* with a large black discocellular spot, slightly defined transverse discal spots and a patch at the posterior angle. *Hindwing* with a small black discocellular spot, and slightly-defined transverse discal spots.

Female. Upperside pale yellow. *Forewing* with the subapical fascia orange yellow. *Hindwing* with the marginal band broad. Underside similar to *Wet* form; the markings of both wings more defined.

Expanse, ♂ ♀  $2\frac{1}{2}$  inches.

## Dry-season Brood (Plate 584, figs. 1d, 1e, ♂ ♀ ).

Male. Upperside pale yellow. *Forewing* similar to extreme *Wet* form. *Hindwing* with the marginal band narrower. Underside with similar markings.

Female. Upperside pale yellow. *Forewing* similar to *Wet* form, the subapical fascia being pale yellow. *Hindwing* with the marginal band narrower as it is in the male. Underside similar to the extreme *Wet* form female, the markings being more developed.

Expanse, ♂ ♀  $2\frac{1}{2}$  inches.

## Extreme Dry-season Brood (Plate 584, figs. 1f, 1g, ♂ ♀ ).

Male. Upperside pale yellow. *Forewing* with the orange subapical fascia moderately broad, its black inner border narrower throughout. *Hindwing* with the black-speckled marginal band much narrower, or decreasingly macular. Underside pale ochreous-yellow, pale yellow at base of forewing. Both wings with sparsely outwardly-disposed slender distinct strigæ. *Forewing* with a blackish discocellular spot and a transverse upper-discal row of brown-speckled spots with white centres. *Hindwing* with a similar white-centred costal spot, and a medial row of discal white-centred spots, the second and third being the largest, also a more distinct discocellular spot.

Female. Upperside pale yellow. *Forewing* with the subapical fascia slightly tinged with orange-yellow, its inner border more broadly black anteriorly, its medial portion consisting of a speckled line, and its lower portion broadly black. *Hindwing* with a broader marginal band than in the male. Underside both wings similar to the male.

Expanse, ♂ ♀  $2\frac{1}{2}$  inches.

HABITAT.—Bengal.

DISTRIBUTION.—The type came from Bengal, the type of *Gauduca* from Calcutta, and the type of *Aluna* from Maldah; we have it also from Barrackpore (Rothnay).

## IXIAS CINGALENSIS.

Plate 585, figs. 1, 1a, 1b, ♂ ♀ (Wet-season Brood), 1c, 1d, 1e, 1f (Dry-season Brood).

*Ixias Cingaleensis*, Moore, Lep. of Ceylon, i. p. 126, pl. 50, figs. 2, 2a, ♂ ♀ (1881) (Wet Form) Butler, Ann. Mag. Nat. Hist. 1898, p. 138. de Nicéville, Journ. As. Soc. Bengal, 1899, p. 213.

*Ixias Pirenassa*, Moore (nec Wallace), Lep. of Ceylon, i. p. 125, pl. 50, figs. 1, 1a, ♂ ♀ (Dry Form). *Ixias Pyrene*, Bingham, Fauna of Brit. India, Butt. ii. p. 193 (1907).

## Wet-season Brood (Plate 585, figs. 1, 1a, 1b, ♂ ♀ ).

Male. Upperside pale yellow. *Forewing* with the subapical orange fascia strongly black veined, the discocellular orange spot at the upper end of cell being sometimes

absent, its black inner border somewhat narrower than in the *Wet* form of *Pirenassa*. Underside uniformly yellow, without markings; the hindwing having a small discocellular spot, and sometimes with slightly indicated discal spots.

Female. Upperside pale yellow. *Forewing* with the sub-apical fascia pale yellow. *Hindwing* with similar marginal band to the male. Underside pale yellow. Both wings with very slightly indicated ordinary discal markings.

Expanse, ♂ 2 to 2½ inches.

Dry-season Brood (Plate 585, figs. 1c, 1d, 1e, 1f, ♂ ♀).

Male. Upperside similar to the *Wet* form. *Forewing* with the black inner border to the sub-apical orange fascia comparatively narrower. *Hindwing* with the marginal band also somewhat narrower, or decreasingly macular. Underside. Both wings slightly flecked with outwardly-disposed delicate strigæ. *Forewing* with a small dusky discocellular spot and an upper discal series of small dusky whitish-centred spots. *Hindwing* with a small discocellular and a discal series of similar spots, of which the costal and two medial are largest and are white-centred.

Female. Upperside yellow. *Forewing* with the sub-apical orange-red fascia narrowly black bordered from below the median vein. *Hindwing* with the black marginal band moderately broad. Underside brighter yellow than in the female of the *Wet* form, more or less slightly flecked with delicate strigæ; a small black discocellular spot, and transverse discal distinct ordinary white-centred spots.

Expanse, ♂ 2, ♀ 2 to 2½ inches.

HABITAT.—Ceylon.

DISTRIBUTION.—Taken by Mr. Wade in Hambanlotte and Haragama near Kandy and at Mulliatim, said to be common, and by Mr. Mackwood in the low jungle north of Kandy, plentifully in April.

#### IXIAS ANDAMANA.

Plate 586, figs. 1, 1a, 1b, ♂ ♀ (Wet-season Brood), 1c, 1d, ♂ ♀ (Dry-season Brood), 1e, 1f, 1g, ♂ ♀ (Extreme Dry-season Brood).

*Ixias Andamana*, Moore, Proc. Zool. Soc. 1877, p. 590, ♂ ♀ (Wet Form) Grose-Smith, Rhop. Exot. i.

*Ixias*, pl. 2, figs. 1, 2, ♂ ♀ (1888), Butler, Ann. Mag. Nat. Hist. 1898, p. 142.

*Ixias Lena*, Swinhoe, Ann. Mag. Nat. Hist. 1890, p. 357, ♂ ♀ (Dry Form).

*Ixias verna*, Bingham (part), Fauna of Brit. India, Butt. ii. p. 195 (1907).

Wet-season Brood (Plate 586, figs. 1, 1a, 1b, ♂ ♀).

Male. Upperside very pale yellowish-white. *Forewing* with the apical half brownish-black, the sub-apical fascia ochreous-red and slightly recurved hindward and outward, its black inner border being broad and irregular. *Hindwing* with a broad black marginal band. Underside pale yellow. *Forewing* with the basal area white,

the apical area (in Inter-dry examples) sometimes faintly speckled with indistinct strigæ; a large black discocellular spot with white central dot, faint traces of transverse discal dusky spots, ending in a blackish patch at the posterior angle. *Hindwing* with a small dusky discocellular spot, and sometimes faint traces of outwardly-disposed strigæ.

Female. Upperside pale yellowish-white. *Forewing* with the ochreous-red subapical fascia narrow and broadly broken at upper and middle median vein, its black inner border blacker than in the male and the basal costal margin broadly grey-black. *Hindwing* with the marginal band also broad. Underside somewhat darker yellow than in the male, the strigæ more distinct. *Forewing* with larger blackish discocellular spot, more defined transverse discal spots, and patch at posterior angle. *Hindwing* with the discocellular spot slightly larger, and with slightly-defined transverse discal pale-centred spots, these latter sometimes being more distinct.

Expanse, ♂ ♀  $2\frac{1}{2}$  to  $3\frac{3}{4}$  inches.

Dry-season Brood (Plate 586, figs. 1c, 1d, ♂ ♀).

Male. Upperside pale yellowish-white. *Forewing* with the black inner border of the ochreous-red subapical fascia narrower than in the male of the Wet-season form. *Hindwing* with the marginal band also much narrower. Underside brighter yellow. *Forewing* with the outwardly-disposed strigæ more distinct, the discocellular spot and the transverse discal spots white-centred, the posterior patch also more developed, but the patch is smaller. *Hindwing* sparsely flecked throughout with delicate strigæ; discocellular spot small and distinct; a transverse discal series of blackish spots, the upper four being large and white-centred.

Female. Upperside pale yellowish-white. *Forewing* with the ochreous-red sub-apical fascia similar to that in the Wet-season form, its inner black border much narrower throughout. *Hindwing* with the marginal band somewhat narrower than it is in the male. Underside similar to the male.

Expanse, ♂ ♀  $2\frac{1}{4}$  to  $2\frac{1}{2}$  inches.

Extreme Dry-season Brood (Plate 586, figs. 1e, 1f, 1g, ♂ ♀).

Male. Upperside pale yellowish-white. *Forewing* with the inner border of the sub-apical fascia somewhat narrower than in the ordinary Dry-season form. *Hindwing* with the marginal band also somewhat narrower. Underside similar, except that the markings are less developed.

Female. Upperside yellowish-white. *Forewing* with the ochreous-red subapical fascia entire, not being broken at the median vein, its inner black border much narrower throughout, the upper portion composed of an oblique straight bar, and the medial portion edged by a few black scales, the basal costal area narrower than in the

ordinary Dry-season form and grey in colour. *Hindwing* with the marginal band narrow and similar to the band of the male. Underside similar to the male, the markings being more developed.

Expanse, ♂ 2½ to 2½ inches.

HABITAT.—Andaman Islands.

### IXIAS LATIFASCIATUS.

Plate 587, figs. 1, ♂ (Wet-season Brood), 1a, 1b, 1c, ♂ ♀ (Extreme Wet-season Brood), 1d, 1e, 1f, 1g, ♂ ♀ (Dry-season Brood).

*Ixias Latifasciatus*, Butler, Proc. Zool. Soc. 1871, p. 252, pl. 19, f. 3 ♀. Butler, Ann. Mag. Nat. Hist. 1898, p. 137.

*Ixias Pallida*, Moore, Proc. Zool. Soc. 1878, p. 837.

*Thestias Pyrene*, Doubleday (nee Linn.), Gen. D. Lep. i. pl. 8, fig. 1 ♂ (1836).

*Ixias Pyrene*, Bingham (part), Fauna of Brit. India, Butt. ii. p. 195 (1907).

Wet-season Brood (Plate 587, fig. 1, ♂).

Male. Upperside pale sulphur-yellow. *Forewing* with the orange fascia moderately broad, having two discocellular portions within end of cell, its black inner border being uniformly broad throughout its length. *Hindwing* with the black marginal band very broad and of equal width. Underside pale yellow. Posterior margin of forewing white. Both wings with very slightly apparent outwardly-disposed delicate strigæ and small discocellular spot. *Forewing* with a slight dusky patch at the posterior angle.

Expanse, ♂ 2½ inches.

Extreme Wet-season Brood (Plate 587, figs. 1a, 1b, 1c, ♂ ♀).

Male. Upperside paler yellow than the ordinary Wet-season form. *Forewing* similar; sometimes the lower divided portion at the end of the cell in the subapical fascia is absent. *Hindwing* with a slightly broader marginal band. Underside of a deeper yellow. Both wings flecked with darker strigæ, which are more numerous and somewhat confluent on the exterior portions, those on the disc form an apparent discal series of spots; the discocellular spot on the *forewing* much larger and the patch at posterior angle more distinct than in the Wet-season male.

Female. Upperside pale yellow. *Forewing* with the ordinary-shaped sub-apical fascia pale orange, its black inner border broader than in the male, the basal and costal area being also broadly black. *Hindwing* with the black marginal band broader than in the male. Underside somewhat deeper yellow, the strigæ more distinct, the discocellular spot larger, that on the *forewing* with white pupil, and the posterior patch at the angle larger; the transverse discal spots somewhat more apparent.

Expanse, ♂ ♀ 2½ to 2¾ inches.

Dry-season Brood (Plate 587, figs. 1d, 1e, 1f, 1g, ♂ ♀ = *Pallida*).

Male. Upperside white. *Forewing* with the orange fascia and its wide black inner border as in the Wet-season form, the upper of the two portions at the end of the cell in the fascia only present. *Hindwing* with the black marginal band also of similar width. Underside pale yellow. Both wings flecked with delicate strigæ; slight indications of discal spots being present, a distinct black discocellular spot, that of the *forewing* with a central white dot, and there is also a black patch at the posterior angle.

Female. Upperside white. *Forewing* with the subapical fascia paler than in the Extreme Wet-season form; the broad basal and costal areas being greyish-black. *Hindwing* with the marginal band slightly narrower than it is in the male. Underside paler than in the male, the strigæ similar, the discocellular spot and transverse discal spots more developed and slightly white-centred, the patch on the posterior angle of *forewing* being also larger and blacker.

Expanse, ♂ ♀  $2\frac{1}{2}$  inches.

HABITAT.—Burma, Shan States.

DISTRIBUTION.—Bhamo, November (Fea); Bassein, October; Pegu, May and September (Bingham); Tenasserim, August (Fea). There are examples in coll. Rothschild from Muong Gnow, Shan States, and from Toungoo, May in Grose-Smith's coll., and in coll. Swinhoe from Bassein, Rangoon, Heng and Mandalay.

## IXIAS MOULMEINENSIS.

Plate 588, fig. 1, ♂, 1e, ♀ (Wet-season Brood), 1b, ♂, 1c, ♀ (Dry-season Brood), 1a, 1d, ♂ ♂ (Extreme Dry-season Brood, two forms).

*Ixias Moulmeinensis*, Moore, Proc. Zool. Soc. 1878, p. 837, ♂ ♀ (Dry Form). Watson, Journ. Bo. Nat. Hist. Soc. 1894, p. 505, pl. 2, fig. 25 (Wet Form ♂), fig. 26 (Dry Form ♂); id. 1897, p. 669. Butler, Ann. Mag. Nat. Hist. 1886, p. 188; id. 1898, p. 139.

*Ixias Meipona*, Grose-Smith, Ann. Mag. Nat. Hist. 1887, p. 296; id. Rhop. Exot. i. ix. pl. 2, figs. 4, 5, ♂ (1888) (Wet Form).

*Ixias Pyrene*, Bingham (part), Fauna of Brit. India, Butt. ii. p. 193 (1907).

## Wet-season Brood (Figs. 1, 1e, ♂ ♀).

Male. Upperside clear pale yellow. *Forewing* with the sub-apical orange-red fascia somewhat narrower than in the *Wet* form of *Latifasciatus*, its black inner border being also narrower. *Hindwing* with the marginal band also much narrower. Underside clear pale yellow; discocellular spot small; the dusky patch at posterior angle of the *Forewing* small and slightly defined.

Female. Very similar to the male. *Forewing* with the orange-red fascia smaller, its black borders broader, its inner border contracted in the middle, much thickened upwards and continued in a broad band along the costa to the base. *Hindwing* with the black outer border narrower and diffused. Underside similar to the male.

Expanse, ♂ 2, ♀  $2\frac{1}{4}$  inches.

## Dry-season Brood (Figs. 1b, 1c, ♂ ♀).

Male. Upperside clear pale yellow. *Forewing* with the black inner border of the orange-red sub-apical fascia slightly narrower than in the *Wet* form. *Hindwing* with the marginal band narrower. Underside ochreous-yellow. Both wings with delicate slender strigæ, transverse discal spots with whitish centres. *Forewing* with a large dusky discocellular spot. *Hindwing* with a small similar spot.

Female. Upperside clear pale yellow. *Forewing* with a moderately broad orange-red sub-apical fascia, its black inner border being slender medially and broad anteriorly, the basal costal area broadly blackish-grey. *Hindwing* with the black marginal band broader than in the male. Underside similar to the male, the transverse discal spots with whitish centres, the discocellular spot more prominent. *Forewing* also with a dusky patch at the posterior angle.

Expanse, ♂ 2 to  $2\frac{1}{4}$ , ♀  $1\frac{3}{4}$  to  $2\frac{1}{4}$  inches.

## Extreme Dry-season Brood (Figs. 1a, 1d, ♂ ♂).

Male. Upperside pale yellow. *Forewing* with the orange-red fascia larger and the black borders narrower than in the ordinary Dry form. *Hindwing* with the marginal band narrower, sometimes consisting of small spots or entirely unmarked.

Underside similar to the *Dry* form, except that both wings have the discal spots more developed.

Female. Upperside pale yellow. *Forewing* with the sub-apical fascia orange-red, its black inner band composed of an anterior oblique even-edged bar, from which to beneath the middle median veinlet the edge is not black scaled, and from thence to the posterior angle it is much narrower than in the ordinary dry female. *Hindwing* with marginal band slightly developed, narrow, often macular. Underside similar to the male.

Expanse, ♂ ♀ 2 to  $2\frac{1}{4}$  inches.

HABITAT.—Maulmein to Meetan, Burma.

*Note*.—In Fig. 1a the artist unfortunately copied a male instead of a female of the extreme Dry-season Brood.

#### IXIAS CITRINA.

Plate 588, fig. 2, ♂, 2a, ♀ (Wet-season Brood), 2b, ♂ (Dry-season Brood).

*Ixias Citrina*, Moore, Proc. Zool. Soc. 1878, p. 837 (Dry Form).

*Ixias Verna*, Bingham (part), Fauna of Brit. India, Butt. ii. p. 195 (1907).

Wet-season Brood (Figs. 2, 2a, ♂ ♀).

Male. Upperside pale yellowish-white. *Forewing* with the sub-apical orange-red fascia comparatively broader anteriorly and shorter posteriorly, its black inner border narrower than in *Pallida* = *Wet Latifasciatus*. *Hindwing* with the marginal band also half its width. Underside pale yellow. Both wings with slightly apparent strigæ, discal ordinary disposed spots and discocellular spots.

Female. Upperside very pale yellow. *Forewing* with the sub-apical fascia often pale yellow, its black inner border medially slender and sometimes broken. *Hindwing* with the marginal band broader than in the male. Underside similar to the male, the posterior patch on the forewing being larger.

Expanse, ♂ ♀  $2\frac{1}{4}$  inches.

Dry-season Brood (Fig. 2b).

Male. Upperside pale yellowish-white. *Forewing* similar to the *Wet* form. *Hindwing* with the marginal band narrower. Underside more ochreous, with the strigæ, discocellular spot, and discal markings darker, the latter with whitish centres.

Female. Not known.

Expanse,  $2\frac{1}{4}$  inches.

HABITAT.—Tenasserim, South Burma.

## IXIAS MARIANNE.

Plate 589, figs. 1, 1a, ♂ ♀ (Wet-season Brood), 1b, 1c, ♂ ♀ (Dry-season Brood), 1d (Another Form), 1e, ♀ (Another Form with pinkish tinge), 1f, 1g, ♂ ♀ (Extreme Dry-season Brood).

*Papilio Marianne*, Cramer, Pap. Exot. iii. pl. 217, figs. C, D, ♀, E, ♂ (1780) (Wet Form).

*Papilio Sesia*, Fabricius (part), Mant. Ins. p. 22 (1787).

*Thesrias Marianne*, Boisduval, Spéc. Gen. Lep. i. p. 592 (1836). Doubleday, Gen. D. Lep. p. 61 (1847). Butler, Catal. Fabr. Lep. B. M. p. 216 (1869).

*Ixias Marianne*, Hübner, Verz. bek. Schmett., p. 95 (1816). Butler, P.Z.S. 1871, p. 253. Moore, Lep. Ceylon, i. p. 126 (1881); id. Proc. Zool. Soc. 1882, p. 254. Watson, Journ. Bo. Nat. Hist. Soc. 1890, p. 36. Betham, Journ. Bo. Nat. Hist. Soc. 1891, p. 324. Watson (part), Journ. Bo. Nat. Hist. Soc. 1894, pp. 504, 507, pl. 2, figs. 17, 18, 19. Butler, Ann. Mag. Nat. Hist. 1898, p. 143. Mackinnon and de Nicéville, Journ. Bo. Nat. Hist. Soc. 1898, p. 591, de Rhé-Philippe, Journ. Bo. Nat. Hist. Soc. 1902, p. 492. Bingham, Fauna of Brit. India, Butt. ii. p. 196 (1907).

*Pieris Marianne*, Godart, Enc. Méth. ix. p. 120 (1819).

*Pontia Marianne*, Horsfield, Catal. Lep. Mus. E.I.C. p. 142 (1829).

*Ixias Bebryce*, Hübner, Verz. bek. Schmett. p. 95, ♂ (1816).

*Anthocharis Marianne*, Lucas, Lep. Exot. pl. 35, fig. 1, ♂ (1845).

*Ixias Agnivena*, Moore, Ann. Mag. Nat. Hist. 1877, p. 50, ♂ ♀ (Extreme Dry). Butler, Proc. Zool. Soc. 1880, p. 150. Swinhoe, Proc. Zool. Soc. 1885, p. 141.

*Ixias Depalpura*, Butler, Proc. Zool. Soc. 1883, p. 153, pl. 24, figs. 6, 7, ♂ ♀ (Extreme Dry), Swinhoe, Proc. Zool. Soc. 1886, p. 432.

*Ixias Meridionalis*, Swinhoe, Proc. Zool. Soc. 1885, p. 140, pl. 9, fig. 5, ♀ (Dry Form); id. 1886, p. 432.

*Ixias Cumballa*, Swinhoe, l.c. p. 141, pl. 9, figs. 13, 14, ♂ ♀ (Wet Form).

Wet-season Brood (Figs. 1, 1a, ♂ ♀).

Male. Upperside white, the basal areas and the inner edge of the black oblique band in the forewing tinged with bluish-grey. *Forewing* with a broad sub-apical orange-red fascia (broader than in all other Indian species), the upper discocellular portion only of which is always present; the black inner oblique transverse border broad. *Hindwing* with the black marginal band broad and continuous. Upperside pale sulphur-yellow. Both wings with a few outwardly-disposed very slightly defined slender dusky strigæ. *Forewing* with the basal area white, the subapical area medially flushed with pale orange; a black large discocellular spot, centred with a white dot, a transverse discal series of small black spots, a black patch at the posterior angle, and a streak on the end of the middle median veinlet. *Hindwing* with a small black discocellular spot with white centre, and a transverse discal series of blackish-brown spots, of which the middle two, three, or four are the larger and pale-centred.

Female. Upperside white as in the male, or very rarely the ground colour is slightly orange-tinted. *Forewing* with the basal area tinged with darker bluish-grey than in the male, the sub-apical orange fascia narrower, sometimes whitish apically,

and traversed by four black spots, its inner black border being sometimes narrower than in the male. *Hindwing* with the black marginal band broader than in the male. Underside similar to the male (or rarely the ground colour is of an ochreous tint, which is brightest in the forewing) except that all the markings are more prominent.

Expanse, ♂ ♀  $2\frac{1}{4}$  to  $2\frac{1}{2}$  inches.

Dry-season Brood (*Meridionalis*), (Figs. 1b, ♂, 1c, 1d, 1e, ♀).

Male. Upperside white. *Forewing* similar to the *Wet* form, the black inner border of the orange fascia generally slightly narrower. *Hindwing* with the black marginal band also narrower. Underside similar to the *Wet* form, the transverse series of discal spots being more developed, and those on the hindwing white-centred.

Female. Upperside white. *Forewing* with the sub-apical orange fascia as in the *Wet* form, its black inner border anteriorly formed by an oblique bar, terminating at the lower end of the cell, the ordinary medial portion being absent, or sometimes very slightly indicated by a few slightly defined scales, and the lower end pointedly terminating at the posterior angle. *Hindwing* with the black marginal band sometimes narrower, sometimes broader, than in the male. Underside deeper yellow than in the *Wet* female. *Forewing* with the sub-apical orange flush brighter, the discocellular spot and outer markings more prominent, the upper discal spots pale-centred. *Hindwing* with the markings more prominent, all the discal spots being more prominent, larger, and white-centred.

Expanse, ♂ ♀  $1\frac{3}{4}$  to 2 inches.

Extreme Dry-season Brood (*Agnivena* = *Depalpura*), (Figs. 1f, 1g, ♂ ♀).

Male. Upperside white. *Forewing* with the black inner border of the subapical orange fascia narrower than in the ordinary *Dry* form. *Hindwing* also with the black marginal band narrower. Underside of deeper and duller yellow; the markings similar. *Forewing* with the upper discal spots whitish-centred. *Hindwing* with the discal spots more distinctly white-centred.

Female. Upperside white. *Forewing* similar to the *Dry* form; the medial portion of the inner band of the orange fascia without any traces of black scales. *Hindwing* with the marginal band somewhat narrower. Underside similar to the male.

Expanse, ♂ ♀  $1\frac{3}{4}$  to 2 inches.

LARVA.—Pale green, with a lateral pale reddish narrow band; feeds on *Capparis sepiaria* (Grote).

PUPA.—Pale green, anteriorly bent backwards; head pointed in front; thorax dorsally convex; wing-covers much produced and convex in front, with a slightly reddish sub-apical patch; abdomen pointed at end.

HABITAT.—Throughout the plains of India and Ceylon, except in the desert portions.

DISTRIBUTION.—Eastern Provinces, Plains, also in forest lands; fond of damp spots (Hutchinson, Ceylon). Taken by us (*Meridionalis*) at Poona in October and November; in Bombay, December; Belgaum, September and October; Ahmednuggur, October and November; in Bombay (Cumballa), July and August; Hambantote and Mulliatum, Ceylon, common (Wade). Watson reports its capture in Mysore, Betham in the Central Provinces, Mackinnon in Mussoorie, and de Rhé-Philipe at Lucknow, and we have it from Manipur, Deesa and Karachi.

#### IXIAS NOLA.

Plate 590, figs. 1, 1a, ♂ ♀ (Wet-season Brood), 1b, 1c, ♂ ♀ (Dry-season Brood), 1d, 1e, ♂ ♀ (Extreme Dry-season Brood).

*Ixias Nola*, Swinhoe, Proc. Zool. Soc. 1889, p. 399. Watson, Journ. Bo. Nat. Hist. Soc. 1894, p. 504.

Butler, Ann. Mag. Nat. Hist. 1898, p. 143. Bingham, Fauna of Brit. India, Butt. ii. p. 197 (1907). de Rhé-Philipe, Journ. Bo. Nat. Hist. Soc. 1908, p. 885.

#### Wet-season Brood (Figs. 1, 1a, ♂ ♀).

Male. Upperside white. *Forewing* with the sub-apical orange fascia much narrower throughout than in the *Wet* form of *Marianne*, being also curved uniformly outward, and without any trace of the ordinary red upper portion at end of the cell, its black inner border being of a similar broad width. *Hindwing* with a narrower, decreasing, posteriorly macular band, which terminates generally at the middle median veinlet. Underside pale yellow. *Forewing* with the basal area white; apex slightly flecked with grey strigæ, the sub-apical area being flushed with very pale orange; discocellular black spot large and with a minute white centred dot; ordinary blackish upper discal spots, the anterior one slightly whitish centred. *Hindwing* slightly flecked with grey strigæ, the discocellular spot small, brown, with white centred dot; discal spots more or less ill-defined, brownish, the centres whitish.

Female. Upperside white. *Forewing* of similar pattern to same sex in the *Dry* form of *Marianne*, the sub-apical orange fascia much narrower, with three traversing black spots only, its black anterior portion as in the *Dry* form of *Marianne*, broad and acutely angled at the lower end, the medial portion without any traces of dark scales. *Hindwing* with the marginal band similar to the male, but narrower and generally extending only halfway down the wing. Underside similar to the male.

Expanse, ♂ 2 inches.

#### Dry-season Brood (Figs. 1b, 1c, ♂ ♀).

Male. Upperside white. *Forewing* with the black inner border of the sub-apical orange fascia narrower throughout than in the *Wet* form, the medial portion being

more or less slender. *Hindwing* with the marginal band also narrower and usually extending only halfway down the wing. Underside similar to the *Wet* form, except that the transverse discal markings of the *hindwing* are more prominent and whiter centred.

Female. Upperside white. *Forewing* similar to the *Wet* form, the upper and lower portion of the black inner band to the sub-apical orange fascia narrower. *Hindwing* with the marginal band narrower. Underside similar to the *Wet* form, the discal markings less developed.

Expanse, ♂ ♀  $1\frac{3}{4}$  to 2 inches.

Extreme Dry-season Brood (Figs. 1d, 1e, ♂ ♀).

Male. Upperside white. *Forewing* similar to the ordinary *Dry* form, except that the upper portion of the black inner border of the sub-apical orange fascia is smaller and somewhat broken at the upper end of the cell, and the end of it is more equally quadrate, the medial edge of the fascia being without any dark scaling, or sometimes a few are slightly visible. *Hindwing* with a slightly-defined dusky upper marginal narrow macular band. Underside similar to the ordinary *Dry* form. Both wings with the markings similar but less developed.

Female. Upperside white. *Forewing* similar to the ordinary *Dry* female, except that the upper portion of the black inner band to the orange fascia is smaller and more equally quadrate posteriorly. *Hindwing* as in the male. Underside similar to the male, but paler throughout.

Expanse, ♂  $1\frac{1}{2}$  to  $1\frac{3}{4}$ , ♀  $1\frac{1}{2}$  inches.

HABITAT.—Mahableshwur.

Seems to be confined to the Mahableshwur Mountains; two stragglers were, however, taken by us at Poona in the month of April, and another by de Rhé-Philipe at Khandalla in October, 1907. Colonel Bingham (p. 197) suggests that it may be a variety of *Ixias Marianne*, but we have all the seasonal forms in a long series of this very distinct species in the British Museum and in our own Collection.

#### INDO-MALAYAN AND INDO-CHINESE SPECIES.

*Ixias Eippie*, *Papilio Eippie*, Drury, Ill. Exot. Ent. i. pl. 5, fig. 2 (1773). Butler, Ann. Mag. Nat. Hist. 1889, p. 136. Habitat, China.

*Ixias Venilia*, *Pieris Venilia*, Godart, Enc. Méth. ix. p. 121 (1819). Horsfield (Pontia), Cat. Lep. E.I.C. p. 143 (1829). Wallace, Trans. Ent. Soc. 1867, p. 392. Lucas, Lep. Exot. pl. 36, fig. 1 (1835). Butler, Ann. Mag. Nat. Hist. 1898, p. 135. Habitat, Java.

*Ixias Balice*, *Thestias Balice*, Boisduval, Spéc. Gen. Lep. i. p. 593 (1836). Wallace, Trans. Ent. Soc. 1867, p. 393. Butler, Proc. Zool. Soc. 1871, p. 253. Fruhstorfer, Berl. Ent. Zeit. 1894, p. 246, pl. 18, fig. 9, ♀. Habitat, Java.

*Ixias Ludekingii*, *Thestias Ludekingii*, Vollenhoven, Monog. Pieridæ, p. 49, pl. 5, fig. 6 (1865); id. Tijd. voor Ent. 1869, p. 126. Wallace, Trans. Ent. Soc. 1867, p. 396. de Nicéville, Journ. As. Soc. Bengal, 1895, p. 500. Habitat, Sumatra.

*Ixias Vollenhovii*, Thestias Vollenhovii, Wallace, Trans. Ent. Soc. 1867, p. 393. Butler, Ann. Mag. Nat. Hist. 1898, p. 135. *Synonym*, Thestias Venatrix, Wallace, i.c. p. 393. *Ixias Venatrix*, Butler, Proc. Zool. Soc. 1871, p. 254, pl. 19, fig. 1, ♂. Habitat, Java; described in error by Wallace as from Maulmein.

*Ixias undatus*, Butler, Proc. Zool. Soc. 1871, p. 252, pl. 19, fig. 4, ♂. Druce, Proc. Zool. Soc. 1873, p. 356. Butler, Ann. Mag. Nat. Hist. 1898, p. 137. Habitat, Borneo.

*Ixias verna*, Druce, Proc. Zool. Soc. 1874, p. 108, pl. 16, figs. 5, 6, ♂ ♀. Habitat, Siam.

*Ixias Insignis*, Butler, Cistula, Entom. ii. p. 431, pl. 8, fig. 1, ♂ (1877); id. Ann. Mag. Nat. Hist. 1898, p. 137. Habitat, Formosa.

*Ixias Birdii*, Distant, Ann. Mag. Nat. Hist. 1883, p. 351; id. Rhop. Malayana, p. 309, pl. 26, fig. 4, ♂ (1885). Butler, Ann. Mag. Nat. Hist. 1898, p. 137. Habitat, Malay Peninsula.

*Ixias Flavipennis*, Grose-Smith, in Forbes' Nat. Wanderings, p. 275 (1885). Butler, Ann. Mag. Nat. Hist. 1898, p. 135. Thestias Flavipennis, Snellen, Tijd. voor Ent. 1891, p. 335, pl. 16, figs. 1, 2, ♂, 3, 4, ♀. *Synonym*, Ixias Pyrites, Weymer, Stett. Ent. Zeit. 1886, pl. i. fig. 4, ♂; id. 1887, p. 13. Habitat, Sumatra.

*Ixias Yunnanensis*, Fruhstorfer, Soc. Entom. 1902, p. 81, ♀. Habitat, Yunnan.

*Ixias Malum-Sinicum*, Thieme, Berl. Ent. Zeit. 1896, p. 408. Habitat, Nias.

NOTE.—As regards China, this genus seems to be confined to the south; no mention of it is made by Leech in his Butterflies of China, Japan and Corea.

This practically ends Dr. Frederick Moore's contribution to these volumes; for the remainder I have his notes to go on; it is a very great pity he did not live to finish the entire work, the compilation of his lifetime; his notes are innumerable, and refer to the whole of the Heterocera as well as the Rhopalocera; his knowledge of the Lepidoptera of the Indian Region was very great; he was the father of all Indian Lepidopterists, always patient, kindly and courteous, never sparing time or trouble in helping workers who came to him for assistance; his industry was prodigious, his Books and Memoirs on the Indian Lepidoptera extend over a long period of years, many of them will remain as standard works; his Monograph of the Limnaina and Euploea, published in the Proceedings of the Zoological Society, 1883, is a classic; his division of the different genera, though misunderstood by ordinary Collectors, was almost at once adopted by all scientific Lepidopterists in Germany, and is now universally adopted.

I must, of course, continue the work on Dr. Moore's lines, otherwise I should adopt the excellent trinomial system used by Messrs. Rothschild, Hartert, and Jordon; so much nonsense has been written about the multiplicity of names, and as to what is, or is not a species, the trinomial system seems to be necessary to show Collectors that, because a name is given to an insect, it does not mean that this insect represents a distinct species; the study of variation and of local and seasonal forms is the very essence of the theory of evolution, and for the sake of convenience, if for nothing else, every form must have a name: as I cannot use the trinomial system, I will endeavour to put the typical species first and follow on with the allied forms.

## Genus EUCHLOË.

*Euchloë*, Hübner, Verz. bek. Schmett. p. 94 (1816). Westwood, British Butterflies, p. 30 (1841).

Butler, Cistula, Entom. i. p. 39 (1870). Kirby, Cat. Diurnal, Lep. p. 505 (1871).

*Anthocharis*, Boisduval (part), Sp. Gen. Lep. i. p. 585 (1836). Doubleday, Gen. Diurnal, Lep. p. 55 (1847).

*Sinchloë*, Bingham (part), Fauna of Brit. India, Butt. ii. p. 179 (1907).

IMAGO. *Forewing*. Costa somewhat arched, apex obtuse, exterior margin slightly oblique; lower angle rounded, inner margin long and nearly straight, more than three-fourths the length of the costa; cell half as long as the wing, sub-costal nervure five-branched, the first two branches emitted before the end of the cell, the upper radial, thrown off a little beyond the cell, the middle discocellular nervule well marked; all the veins present. *Hindwing* longer than the forewing, costa somewhat arched, especially near the base, exterior margin and lower angle evenly rounded, inner margin nearly straight to near the base, then strongly concave; cell broad, lower discocellular the longest, middle discocellular short. Antennæ short, less than half the length of the forewing, club abrupt, broad and flat, palpi slender, third joint short; head and palpi very hairy in front.

Type, *Belia*, Linn., from Africa.

## EUCHLOË DAPHALIS.

Plate 590, figs. 2, ♂, 2a, ♀.

*Anthocharis Daphalis*, Moore, Proc. Zool. Soc. 1865, p. 491, pl. 31, fig. 14, ♂.

*Euchloë Daphalis*, Moore, Proc. Zool. Soc. 1874, p. 273.

*Sinchloë Daphalis*, Leslie and Evans, Journ. Bo. Nat. Hist. Soc. 1903, p. 676. Bingham, Fauna of Brit. India, Butt. ii. p. 180 (1907).

*Euchloë Venosa*, Butler, Proc. Zool. Soc. 1880, p. 151, pl. 15, fig. 5.

Male. White, with the base of both wings irrorated with black scales. *Forewing* with the costal margin delicately chequered with black, a black band at the apex containing a large white spot and three or four marginal spots, its inner portion sinuous and attenuated hindwards, a transverse black spot at the end of the cell, more or less lunate. *Hindwing* without markings, but the pattern of the underside distinctly showing through the wing. Underside *Forewing* creamy-white, costa chequered with black, the discoidal spot with white centre, the apex chequered with pale greenish-brown, the interspaces being pale silvery white. *Hindwing* with transverse irregular bands of greenish-brown overlaid with greenish-yellow scales, the interspaces shining silvery white.

Female. Differs from the male chiefly in having a more rounded apex to the forewing.

Expanse, ♂ ♀  $1\frac{1}{4}$  inches.

HABITAT.—Western Himalayas.

DISTRIBUTION.—The type was taken at Kumaun, there are examples in the British Museum, and other collections from Chitral, Goorais Valley, Attock Bridge, Kairabad, and the Punjab. Mr. Lang, in his notes, says it is not likely to be caught by many persons, it flies high up in April, the brood is very early and very short-lived.

### EUCHLOË LUCILLA.

Plate 590, figs. 3, ♂, 3a, ♀.

*Euchloë Lucilla*, Butler, Proc. Zool. Soc. 1886, p. 376, pl. 35, fig. 4; id. Ann. Mag. Nat. Hist. 1888, p. 205.

*Anthocharis Lucilla*, Baker, Trans. Ent. Soc. 1889, p. 525.

*Synchloë Lucilla*, Bingham, Fauna of Brit. India, Butt. ii. p. 180 (1907).

Male. Upperside lemon-yellow. Both wings with the base irrorated with black scales. *Forewing* with a black band on the outer border, broad at the apex and narrowing hindwards, traversed obliquely by a more or less obscure macular band of the ground colour; cell closed by a very broad black bar. *Hindwing* without markings. Underside paler and duller. *Forewing* with the outer band showing through the wing and irrorated with minute black scales; the discoidal bar shorter; often a pink line along the costal and outer margins; the costa towards the apex with a series of small white spots, each spot containing a black dot. *Hindwing* with thick black irrorations, a small white spot at the end of the cell and a series of white transverse spots along the costal margin; antennæ brown tinged with yellow, head brown, collar pink, thorax brown, abdomen black on the sides and yellow beneath.

Female. Upperside pale sulphur-yellow. *Forewing* with the black outer marginal band similar in size to the male, the pale line traversing it generally much more prominent and distinct; the discocellular bar broader. *Hindwing* without markings. Underside as in the male, colour of the antennæ, head and body similar.

Expanse, ♂ ♀  $1\frac{1}{2}$  inches.

HABITAT.—The Punjab.

DISTRIBUTION.—The type was taken by Colonel Yerbury at Campbellpur; we have examples also from Attok and Khairabad.

### INDO-CHINESE AND JAPANESE SPECIES AND GENERA.

*Euchloë Scolymus*, Anthocharis Scolymus, Butler, Journ. Linn. Soc. 1866, p. 52. Elwes, Proc. Zool. Soc. 1881, p. 877. Pryer, Rhop. Niphon, p. 6, pl. 3, figs. 4a, 4b (1886). Leech, Butt. of China, Japan and Corea, ii. p. 479 (1893). *Synonym*, Anthocharis Thunbergii, De l'Orza, Lep. Japan, p. 14 (1869). Habitat, Japan.

*Euchloë Bambusarum*, Anthocharis Bambusarum, Oberthür, Et. d'Ent. ii. p. 20, pl. 3, fig. 4 (1876). Habitat, Chekiang, W. China.

*Euchloë Bieti*, Anthocharis Bieti, Oberthür Et. d'Ent. ix. p. 14, pl. 1, fig. 1, ♀ (1884); id. xi. p. 16, pl. 6, fig. 39, ♂ (1886). Habitat, North-Eastern and Western Thibet.

*Euchloë Thibetana*, Anthocharis cardamines, var. Thibetana, Oberthür, Et. d'Ent. xi. p. 16 (1886). Leech, Butt. of China, Japan and Corea, ii. p. 477 (1893). Habitat, Western China.

*Euchloë Orientalis*, Anthocharis Belia, var. Orientalis, Alphéraky, Rom. Mem. ix. pl. 6, fig. 1 (1897). Habitat, Western Thibet.

*Leucophasia Sinensis*, Leptosia Sinensis, Butler, Cist. Entom. i. p. 173 (1873). Habitat, Shanghai.

*Leucophasia Vibilia*, Jansen, Cist. Entom. ii. p. 272 (1878). Habitat, Japan.

*Leucophasia Morsei*, Leptosia Morsei, Fenton, Butler, Proc. Zool. Soc. 1881, p. 855. Fenton, Papilio, ii. p. 35, figs. 3, 4, 5 (1882). Habitat, Japan.

*Agalais Gigantea*, Leucophasia Gigantea, Leech, Entomologist, xxiii. p. 45 (1890); id. Butt. of China, Japan and Corea, ii. p. 484, pl. 36, figs. 10, 11 (1893). Agalais Gigantea, Grote, Proc. Am. Soc. 1900, p. 13. *Synonym*, Leucophasia immacula, Leech, Butt. of China, Japan and Corea, p. 484 (1893). Habitat, Central and Western China.

#### Genus HEBOMOIA.

*Hebomoia*, Hübner, Verz. bek. Schmett. p. 95 (1816).

*Iphias*, Boisduval, Sp. Gen. Lep. i. p. 595 (1836). Wallace, Trans. Ent. Soc. 1867, p. 396.

These large and handsome butterflies frequent the skirts of forest districts; the males often settle on the ground in damp or muddy places, in company with many Papilionidae and Pieridæ; when thus resting the wings are erect; they are at once distinguishable from all around them by the peculiar attitude they assume, the upper wings being depressed between the lower pair, so that its basal half is completely hidden by them; as probably a consequence of this we find that this basal half of the upper wings is always pale in colour on the underside, and devoid of the characteristic markings of the exposed portions; the females fly rather low, in woods and thickets, and seldom come out into the open grounds, and are therefore less frequently captured (Wallace).

*IMAGO*. *Forewing* triangular, apex more or less acute, costa arched towards apex, exterior margin oblique, posterior margin recurved, costal vein extending to two-thirds the margin, first sub-costal branch rising at one-third and second at one-fourth before end of cell, third from the end, fourth branching from the third at one-fifth before its end, fifth absent; upper discocellular minute, oblique, vein 6 arising close to upper angle of cell, which is little more than half the length of the wing; middle and lower discocellulars concave, the lower slightly the longer.

*Hindwing* sub-oval, broad, exterior margin rounded and sinuous, angles also rounded, inner margin nearly straight to near base, where it is highly convex; pre-costal nervure short, simple, inclining outwards. *Antennæ* about half the length of the forewing, gradually thickened to apex, latter sub-truncate. *Palpi* situated low down the face, somewhat flattened, scaly, clothed with stiff hairs

anteriorly and at the apex, third joint short. Thorax and abdomen robust, legs slender; claspers in the male elongate.

**LARVA.**—Stout, tapering at both ends, green, with pale red-dotted stripe on the sides, and is shagreened on the upper surface.

**PUPA.**—Boat-shaped, like that of *Euchloë*, it is much arched, and produced into a long point at both ends. (Kirby, ii. p. 200, 1896.)

#### HEBOMOIA GLAUCIPPE.

Plate 591, figs. 1, ♂, 1a, ♀ (Wet-season Brood), 1b, ♂, 1c, ♀ (Dry-season Brood).

*Papilio Glauceppe*, Linnaeus, Syst. Nat. i. ii. p. 762 (1767). Drury, Ill. Exot. Ent. i. pl. 10, figs. 3, 4. Cramer, Pap. Exot. ii. pl. 164, figs. A, C.

*Hebomoia Glauceppe*, Hübner, Verz. bek. Schmett. p. 96 (1816). Druce, Proc. Zool. Soc. 1874, p. 108. Wood-Mason and de Nicéville, Journ. As. Soc. Bengal, 1886, p. 371. Elwes and de Nicéville, Journ. As. Soc. Bengal, 1886, p. 431. Murray, Journ. Bo. Nat. Hist. Soc. 1888, p. 26. de Nicéville, Journ. Bo. Nat. Hist. Soc. 1890, p. 387. Manders, Trans. Ent. Soc. 1890, p. 355. Swinhoe, Trans. Ent. Soc. 1893, p. 308. Watson, Journ. Bo. Nat. Hist. Soc. 1897, p. 669. Frühstorfer, Berl. Ent. Zeit. 1898, p. 174. Butler, Ann. Mag. Nat. Hist. 1898, p. 290. Frühstorfer, Iris, 1902, p. 297; id. Soc. Ent. 1903, p. 42. Bingham, Fauna of Brit. India, ii. p. 274 (1907).

*Iphias Glauceppe*, Wallace (part), Trans. Ent. Soc. 1867, p. 396.

*Papilio Callirhoe*, Fabricius, Syst. Ent. p. 473, ♀ (1775).

#### Wet-season Brood (Figs. 1, 1a, ♂ ♀).

Male. Upperside creamy-white. *Forewing* with the costal line prominently black; a large orange-red apical patch bordered with black, the band rather deep at the apex, gradually narrowing downwards, sinuous on its inner side, and somewhat angulated on the veins; the inner band very sinuous, thinner than the outer band, but more uniform in width, and crosses the end of the cell; within the orange-red area are several more or less spear-shaped large black spots in a sub-marginal row, in the interspaces, and in most examples the two bands are joined together below vein 2 by a thick bar, leaving a large orange-red spot below it. *Hindwing* with some black triangular spots on the outer margin, mostly large at the middle of the margin, varying in number, also some two or three upper discal spots in most specimens. Underside. *Forewing* white, apical area of the upperside represented by an ochreous-pink patch, but without the black margins, the inner spear-shaped spots much paler than they are above, covered with brown strigæ, costal line brown. *Hindwing* suffused with ochreous-pink covered with brown strigæ, and with several brown spots varying in position, and with a brown line running from the base through the cell straight to the middle of the outer border.

Female. Upperside creamy white with a slight greenish tinge, the basal portion more or less irrorated with black atoms. *Forewing* with the apical patch larger than in the male, occupying nearly the apical half of the wing, the orange fascia much restricted, consisting generally of four or five orange-red streaks, the four larger lower streaks with large, black, spear-shaped spots in a sub-marginal row in the interspaces, the inner black band broad, almost uniform in width, joining the outer band hindward where it is much thickened and extends to the hinder angle. *Hindwing* with the outer marginal band broad, its inner margins dentated on the veins, a discal row of large sub-triangular black spots. Underside similar to the male, the brown transverse strigæ more dense, the spots more numerous, the costa of the forewing and the medial line of the hindwing darker and more prominent. Antennæ in both sexes dark brown, head and thorax with reddish-brown hairs in front, thorax above greyish-blue, abdomen white with a bluish tinge; on the underside, the head and thorax are brownish and the abdomen white.

Expanse, ♂ 2  $\frac{4}{10}$  inches.

Dry-season Brood (Figs. 1b, 1c, ♂ ♀).

Wings more falcate in both sexes, the ground colour on the upperside purer white. Male. *Forewing* with the apical orange-red fascia larger, the black surrounding bands correspondingly thinner, the inner band much attenuated, and less sinuous. *Hindwing* with the black spots on the outer margin all but obsolete. Underside very similar to the Wet-season form, the brown strigæ and spots more numerous.

Female. Upperside whiter than in the Wet-season form. *Forewing* with the apical orange-red fascia much larger, in some examples almost as large as in the male, the costa black; the outer black band of the fascia a little broader than in the male, the inner band less sinuous and more pronounced, the spear-shaped sub-marginal row of black spots larger and nearer the outer band. *Hindwing* with the discal spots smaller and more round, the band on the outer border thinner, often reduced to mere triangular spots. Underside much as in the male.

Expanse, ♂ 2  $\frac{4}{10}$ , ♀ 2  $\frac{9}{10}$  to 4 inches.

HABITAT.—N.E. India, Sikkim, Bhutan, Assam, Burma.

DISTRIBUTION.—Many examples in our Collection from the Khasia Hills and from Sikkim; reported from Chin Lushi by de Nicéville; from Burma by Murray and Fruhstorfer; from Tavoy by Elwes and de Nicéville; from the North Chin Hills by Watson; from the Shan States by Manders; from Siam, Annam, Tonkin, Hainan, and Hong Kong by Fruhstorfer; it is also found in the Malay Peninsula.

The LARVA and PUPA are from Horsfield's well-known drawings of the Java form (*II. Javanensis*, Wallace).

## HEBOMOIA AUSTRALIS.

Plates 592, figs. 1, 1a, ♂ ♀ (Dry-season Brood).

*Hebomoia Glaucippe*, Moore, Lep. Ceylon, i. p. 127, pl. 49, figs. 1, 1a, ♂ ♀ (Wet-season Brood). Swinhoe, Proc. Zool. Soc. 1885, p. 140. Aitken, Journ. Bo. Nat. Hist. Soc. 1887, p. 38. Fergusson, Journ. Bo. Nat. Hist. Soc. 1891, p. 444. Betham, Journ. Bo. Nat. Hist. Soc. 1894, p. 422. Davidson, Bell and Aitken, Journ. Bo. Nat. Hist. Soc. 1897, p. 572. Aitken and Comber, Journ. Bo. Nat. Hist. Soc. 1903, p. 51.

*Hebomoia Australis*, Butler, Ann. Mag. Nat. Hist. 1898, p. 290. Fruhstorfer, Berl. Ent. Zeit. 1894, p. 174. Manders, Journ. Bo. Nat. Hist. Soc. 1904, p. 79. Bingham, Fauna of Brit. India, Butt. ii. p. 275 (1907).

*Hebomoia Glaucippe Ceylonica*, Fruhstorfer, Iris, 1908, p. 100.

## Wet-season Form.

Male. Upperside creamy-white. *Forewing* with the costal line much narrower than in *Glaucippe*, the orange-red apical patch larger, the outer marginal black band narrower, the black spots smaller, and the inner band nearly obsolete, being represented by a thin sinuous line, or sometimes by a few black scales. *Hindwing* with one, two or three marginal black spear-shaped spots above the middle, and a sub-apical, more or less obscure spot.

Female. Upperside white. *Forewing* with grey irrations towards the base, the costal line greyish on the basal half, the apical orange patch reduced in size, the marginal black band being broader, the spear-shaped sub-marginal black spots more or less joined together on their outer sides, forming orange spots outside them, the two upper ones being generally complete, the inner band better defined than in the male into a continuous sinuous line thickened hindwards. Underside of both wings much as in *Glaucippe*, but the apical patch of forewing and the coloration of the entire surface of the hindwing darker.

Expanse, ♂ ♀ 4 inches.

## Dry-season Brood.

Male. Upperside white. *Forewing* with the costal line very thin, obscure and often greyish-red tinged towards the base, the orange apical patch with the outer border narrower, the sub-marginal spots quite small, the inner band absent, except for a few black scales at its lower end. *Hindwing* without markings.

Female. Upperside white. *Forewing* with a very few grey scales, almost pure white, the apical orange patch as in the Wet-season form, the sub-marginal spots generally well separated. *Hindwing* with the outer marginal band very narrow, the spots small, discal spots very much reduced in size and mostly round, sometimes obscure. Underside in both sexes as in the Wet-season form.

Expanse, ♂ ♀  $3\frac{2}{10}$  to  $3\frac{8}{10}$  inches.

HABITAT.—Southern India and Ceylon.

DISTRIBUTION.—Taken by us at Khandalla and Malabar Hills, Bombay, where the Dry-season form is very plentiful in October, November and December; we have it also from Calicut, and several Wet-season forms from different parts of Ceylon taken in April, May, June and July. Davidson reports it from the Canara District, Aitken and Comber from the Konkan, Betham from Matheran, and Ferguson from Travancore.

#### HEBOMOIA ROEPSTORFI.

Plate 592, figs. 2, ♂, 2c, ♀ (Wet-season Brood), 2b, ♂, 2a ♀ (Dry-season Brood).

*Hebomoia Roepstorfi*, Wood-Mason, Journ. As. Soc. Beng. 1880, pp. 134, 150 and 235. Wood-Mason and de Nicéville, l.c. 1881, p. 251, pl. 14, figs. 3, 4 and 5, ♂ ♀. Bingham, Fauna of Brit. India, Butt. ii. p. 276, pl. 18, fig. 122 (1907).

#### Wet-season Brood (Figs. 2, 2c, ♂ ♀).

Male. Upperside. *Forewing* white tinged with sulphur-yellow; the costal line black as in *Australis*, the orange apical patch broader, spreading into the apex of the discoidal cell, the outer black band similar, the inner band complete and more or less even, but usually thin throughout, except at its upper and lower ends where it is slightly thickened, and usually with two indentations at veins 2 and 4, the sub-marginal row of black spots small and nearly round. *Hindwing* white with the yellow tinge deeper, the exterior margin with a thin black band, thickened on the veins. Underside marked as in *Australis*, but the apical patch of the forewings and the entire hindwings suffused with dark ochreous-yellow.

Female. Upperside. *Forewing* white tinged with sulphur-yellow, with the basal portions irrorated with black scales, the black costal margin thicker than in the male, the apical orange patch reduced, the black outer border being broader, the inner border similar, the sub-marginal black spots much larger, spear-shaped, and much nearer to the margin. *Hindwing* white, with the yellow tinge deeper than in the male, almost chrome-yellow in the outer portions in most specimens, the exterior marginal band broader and angled on the veins, the discal row of black spots smaller than in *Australis*, but of similar shape. Underside of both wings similar to the male.

Expanse, ♂ ♀ 4 inches.

#### Dry-season Brood (Figs. 2b, 2a, ♂ ♀).

Male. Upperside. *Forewing* coloured as in the Wet-season form, the costal margin and orange apical patch similar, except that there is always an orange spot at the lower end of the patch below vein 2, the black inner margin to the patch is generally absent, sometimes faintly indicated, the sub-marginal spots are generally reduced to mere dots. *Hindwing* with the coloration of the Wet-season form, but the band on the exterior border is reduced to a few black spots on the veins and is sometimes entirely absent.

Female. Upperside. *Forewing* coloured as in the Wet-season form, but the black irrations are more faint, the black costal line is pale towards the base, the orange apical patch is similar, but the sub-marginal spots are much reduced in size, and the inner margin either altogether absent or very faintly indicated. *Hindwing* as in the Wet-season form, but the yellow tinge is usually not so deep. Underside of both wings similar.

Expanse,  $3\frac{8}{10}$  to 4 inches.

HABITAT.—Nikobar and Andaman Islands.

DISTRIBUTION.—We have received the species from the Great Nikobars, from Port Blair and from Aberdeen, Andamans. Bingham records it from Barren Island.

#### INDO-MALAYAN SPECIES.

*Hebomoia Borneensis*, Iphias Glauceppe, var. *Borneensis*, Wallace, Journ. Ent. Soc. 1863, p. 3; id. Trans. Ent. Soc. 1867, p. 396. Druce, Proc. Zool. Soc. 1873, p. 356. Habitat, Borneo.

*Hebomoia Javanensis*, Colicis Glauceppe, Horsfield, Cat. Lep. E.I.C. 1829, p. 130. Iphias Glauceppe, var. *Javanensis*, Wallace, Journ. Ent. Soc. 1863, p. 3. Fruhstorfer, Berl. Ent. Zeit. 1898, p. 174. Habitat, Java.

*Hebomoia Philippensis*, Iphias Glauceppe, var. *Philippensis*, Wallace, Journ. Ent. Soc. 1863, p. 3. Fruhstorfer, Berl. Ent. Zeit. 1898, p. 174. Habitat, Philippines.

*Hebomoia Vossi*, Iphias Vossi, Maitland, Tijd. voor Ent. 1859, p. 25. Vollenhoven, Mon. Pier, p. 55, pl. 6, fig. 4 (1865). Wallace, Trans. Ent. Soc. 1867, p. 397. Fruhstorfer, Berl. Ent. Zeit. 1898, p. 174. Habitat, Nias.

*Hebomoia Sumatrana*, Hagen, Pflanzen. Tierwelt von Deli, Sumatra (1890). *Hebomoia Glauceppe*, var. *Sumatrensis*, Hagen, Iris, 1894, p. 36.

*Hebomoia Liukiensis*, *Hebomoia Glauceppe*, Liukiensis, Fruhstorfer, Berl. Ent. Zeit. 1898, p. 171. *Hebomoia Glauceppe*, Adolf Fritz, Zool. Jarb. xi. p. 256, pl. 16, figs. 5, 5a, 5b (1898). (*Gynandromorphus*). Habitat, Liuku Islands, North of Japan.

#### Genus CALLOSUNE.

The *Teracoli* form a little group peculiar to Africa and South-West Asia as far as India and Ceylon, where they represent the Palæarctic genus *Euchloë*. They are very numerous in species, which, though differing much in outward appearance, present few tangible characters by which they can be satisfactorily separated into genera, and hence they have been united into a single genus by Butler, in which he has been followed by Roland Trimen, who formerly treated *Idmais* as distinct. Schatz, however, though admitting the absence of well-marked generic characters, keeps them provisionally separate, because most of the species belonging to each can readily be separated at a glance by their colour and pattern, and he thinks it probable (with which we quite agree) that these differences may be correlated in their early stages. Trimen, while including all the species under the single genus *Teracolus*, divides them into nineteen sections; we prefer to treat the known Indian groups separately, giving the generic characters which mostly apply to all. We omit the genus *Teracolus*, its type being *Subfasciatus*, Swainson, and also *Idmais*, type *Chrysonome*, Klug, no species

of either section occurring within our limits, and the section of which *Faustus*, Olive, is the type we name *Madais*, putting them into three sections: *Callosune*, type *Danaë*, Fabricius; *Colotis*, type *Amata*, Fabricius; and *Madais*, type *Faustus*, Olive; the males of the first section have no sex marks or secondary sexual characters; in *Colotis* the males bear patches of specialized scales or androconia on the upperside of the hind-wing; in *Madais* there is a patch of androconia on the underside of the forewing and upperside of hindwing, and the different patterns and coloration form them into well-divided and natural groups.

The species of these genera have been treated in a most arbitrary manner by Watson and Bingham; for the most part the species belong to desert tracts and sandy countries, but some few of them, such as *Callosune Danaë*, are forest and garden insects, their habits of life are quite different to those of the *Dulcis* group which superficially resemble them; the present writer studied these forms in Bombay where *Danaë* is to be found, and for many months in Scind where *Dulcis* and the other desert forms are very plentiful. The male of *Danaë* has habits akin to the *Kallimas* of the family of *Nymphalidæ*, it settles on a leaf on the top of a tree and remains there for days together, making short flights out and returning to the same spot. On one occasion a male of *C. Danaë* in the garden of one of the Bombay hotels was closely watched for six successive days. On the other hand, the different forms of the *Dulcis* groups are most restless creatures, they seem to be perpetually on the move, wandering long distances without settling at all. Then, again, with reference to the seasonal forms we are in a little difficulty; that nearly all the species herein referred to have seasonal forms corresponding to the seasonal forms of the other groups of Lepidoptera there can be no reasonable manner of doubt. It is true that in the desert districts there is very little actual rainfall, but cloudy and clear sky seasons, and hot and cold seasons, come about with the same regularity as wet and dry seasons in the other parts of the Indian region, and these changes affect the *Teracoli* exactly in the same manner; there are some intergrades, but so there are in nearly all the forms of Lepidoptera. Bingham says, "A slight difference in the rainfall from one week to another, probably even from day to day, in localities where they are found, seems to affect the shade of the ground-colour, the width and prominence or otherwise of the markings on their wings"; but he shows no warranty whatever for these assumptions, and does not quote the authority of any one who has observed them in the desert tracts they inhabit. In Proc. Zool. Soc. 1884, p. 434, we stated "the real home of the *Teracoli* is the sandy desert, and it is a most extraordinary fact that the worse the locality, where nature is a barren wilderness of nothing but intense heat and sand, the more beautiful are the species to be found there, many of them having most brilliant patches of golden orange; regular sun patches, just as if these patches had been burnt into their wings by the sun."

*Aphrodite*, Hübner, Verz. bek. Schmett. p. 95 (1816) (preoccupied).

*Callosune*, Doubleday, Gen. Diurn. Lep. i. p. 57 (1847). Moore, Lep. Ceylon, i. p. 128 (1880). Schatz, Ex. Schmett. ii. p. 72 (1887).

*Colotis*, Bingham (part), Fauna of Brit. India, Butt. ii. p. 259 (1907).

IMAGO.—Orange or crimson tips to the forewings in all the species; no sex marks or secondary sexual characters; wings short, broad. *Forewing* sub-triangular, costa slightly arched, apex almost rounded, exterior margin more or less rounded, costal vein more than half the length of the wing, cell broad; veins 6 and 7 from upper end of cell, 8 absent, 9 from 7 a little above its middle, 10 and 11 emitted at one-fifth and two-fifths before end of cell; upper discocellular short, inwardly oblique, slightly concave, lower deeply concave.

*Hindwing* with the costa much arched, apex rounded evenly with the exterior margin and posterior angle; cell less than half the length of the wing; discocellulars very oblique, upper very short, lower long, outwardly oblique and concave, vein 5 near upper end of cell, 6 from the end, 7 from beyond the middle of cell, 8 much curved; precostal vein long, inclined outwards.

*Antennæ* short, not half the length of the forewing, with an oval flattened club.

*PALPI* rather long, projecting half beyond the eyes, second joint flat, very laxly pilose beneath, third joint slender, legs very long and slender.

PUPA less boat-shaped than in *Euchloë*, with prominent wing covers.

Type, *C. Danaë*, Fabricius.

#### CALLOSUNE EUCHARIS.

Plate 593, figs. 1, 1a, ♂ ♀ (Wet-season Brood = *Pseudevanthe*), 1b, ♂ (Albino), 1c, ♂, 1d, ♀ (Underside Wet Form), 1e, ♂, 1f, ♀, 1h, ♀ (Dry-season Brood), 1g, ♀ (Albino), 1i, 1j, ♂ ♀ (Extreme Dry-season Brood), 1k, ♂, 1l, ♀ (Underside Extreme Form).

*Papilio Eucharis*, Fabricius, Syst. Ent. p. 472 (1775).

*Anthocharis* (*Callosune*) *Eucharis*, Doubleday, Gen. Diurn. Lep. p. 57 (1847).

*Callosune Eucharis*, Moore, Catal. Lep. E.I.C. i. p. 68 (1857). Wallace, Trans. Ent. Soc. 1867, p. 389. Moore, Lep. Ceylon, i. p. 128, pl. 49, fig. 4, ♂ (1880). Swinhoe, Proc. Zool. Soc. 1885, p. 144. Hampson, Journ. As. Soc. Bengal, 1888, p. 362. Fergusson, Journ. Bo. Nat. Hist. Soc. 1891, p. 444.

*Euchloë Eucharis*, Butler, Catal. Fabr. p. 215 (1869).

*Teracolus Eucharis*, Butler, Proc. Zool. Soc. 1876, p. 161. Swinhoe, Proc. Zool. Soc. 1885, p. 144.

Watson, Journ. Bo. Nat. Hist. Soc. 1890, p. 36; id. 1894, p. 522. Butler, Ann. Mag. Nat. Hist. 1897, p. 45. Guy Marshall, Proc. Zool. Soc. 1897, p. 26. de Nicéville, Journ. As. Soc. Bengal, 1899, p. 214. Sharpe, Monograph, Gen. *Teracolus*, i. p. 97, pl. 31, figs. 1, 1a to 1m (1900). Aitken and Comber, Journ. Bo. Nat. Hist. Soc. 1903, p. 51. Manders, Journ. Bo. Nat. Hist. Soc. 1904, p. 79.

*Colotis Eucharis*, Bingham, Fauna of Brit. India, Butt. ii. p. 268 (1907).

*Papilio Aurora*, Cramer, Pap. Exot. iv. pl. 299, figs. A, B (1782).

*Euchloë Cæneos*, Hübner, Verz. bek. Schmett. p. 94 (1816).

*Pieris Titea*, Godart, Enc. Môth. ix. p. 124 (1819).

*Pontia (Mancipum) Titea*, Horsfield, Cat. Lep. E.I.C. 1829, p. 141.

*Teracolus Titea*, Swinhoe, Proc. Zool. Soc. 1885, p. 144.

*Teracolus Pseudevanthe*, Butler, Proc. Zool. Soc. 1876, p. 164, pl. 7, fig. 16, ♂ ♀. Swinhoe, Proc. Zool. Soc. 1885, p. 144.

*Teracolus Pallens*, Moore, Ann. Mag. Nat. Hist. 1877, p. 49.

Wet-season Brood (Figs. 1, 1a, 1c, 1d).

IMAGO.—Male. Upperside white. *Forewing* with the costal line black, a large orange-yellow apical patch, margined on its outer side with a black band, a little narrow in its middle and broadly thickened at its lower end, the inner black margin to the band narrow, thickened somewhat at both ends, indications of a slight shadowy band through the centre of the patch, the black bands meeting at the lower end of the patch fine hindwards to a point almost touching the lower angle of the wing. *Hindwing* with four or five black spots on the exterior margin, on the veins. Underside white. *Forewing* with the orange patch showing through the wing with a band of five or six spots more or less joined together running through its centre. *Hindwing* with a brown spot on the costa a little beyond its middle.

Female. Upperside white, with a few grey scales towards the base. *Forewings* with the orange patch reduced to a band of four, five or six spots, the orange colour much paler than in the male, the black outer and inner bands broad, the inner band recurved, elbowed inwardly before reaching its lower end, where it sometimes stops abruptly, and in some examples is joined to the outer band and narrows hindwards as in the male; a small black spot at the end of the cell. *Hindwings* with the black spots on the exterior margin as in the male, but generally larger. Underside white. *Forewing* with the apical patch showing through the wing, the inner black band well pronounced with a blackish-brown spot below it, immediately below vein 2, also a spot at the end of the cell. *Hindwing* usually tinged with orange-ochreous and covered with ochreous-brown strigæ, sometimes more, sometimes less, a black dot at the end of the cell, a discal irregular brown macular band, angled outwardly below its middle, often broken and incomplete, and brown spots on the veins on the exterior margin. Antennæ, head, thorax and abdomen black, antennæ speckled with white at its sides, head and thorax clothed with short grey brown hairs.

Expanse, ♂ ♀  $1\frac{8}{10}$  inches.

Dry-season Brood (Figs. 1e, 1f, 1h = *Eucharis*).

Male. Upperside white. *Forewing* with the costal line paler, the orange-yellow apical patch larger, because the outer black band is narrower and the inner band is altogether absent except for a brown spot above vein 3, and there is no thickening of

the band hindwards. *Hindwing* similar to that of the Wet-season male, but the spots on the exterior margin are reduced to mere dots. Underside white, somewhat tinged with ochreous-yellow. *Forewing* with the orange patch showing through the wing, the inner band of it represented by three or four brown spots downwards from the costa. *Hindwing* unmarked except for a brown spot on the costa beyond the middle.

Female. Rather variable, the orange-yellow apical patch of the *Forewing* is as usual paler than in the male, but more extensive than in the female of the Wet-season form, because both the outer and inner black bands are much narrower and never meet hindwards, and the spots on the outer border of the *Hindwing* are narrower. Underside similar to the underside of the female of the Wet-season form, but the suffusion on the hindwing is of a darker, richer and more reddish tint.

Expanse, ♂ ♀  $1\frac{7}{10}$  to  $1\frac{8}{10}$  inches.

Extreme Dry-season Brood (Figs. 1i, 1j, 1k, 1l = *Pullens*).

Male. Upperside white. *Forewing* with the costal line obsolescent, the orange-yellow apical patch with a thin outer black border, no indications of an inner band. *Hindwing* immaculate. Underside as in the Dry-season form, the suffusion on the hindwing much brighter and more or less tinged with pink.

Expanse, ♂ ♀  $1\frac{6}{10}$  to  $1\frac{7}{10}$  inches.

This species often exhibits albinism. Fig. 1b represents a male of the Wet-season form, and Fig. 1g a female of the Dry-season form.

HABITAT.—Southern India, Ceylon.

DISTRIBUTION.—Frequents cultivated lands and the outskirts of forests; not a desert insect. Fergusson reports it from Travancore, Aitken and Comber from the Konkan, Hampson from the Nilgiri Hills, Davidson from Khandesh, Watson from Mysore, Manders from Ceylon. It is in our Collection from the Nilgiris, Madras, Belgaum, Bombay, Poona and Mahabaleshwur.

LARVA.—Narrow; much resembles that of a moth, dull green, with no line along the back, but with a yellow or pinkish line along each side. It has an extraordinary habit of resting with the anal segment turned up and not resting on a twig. Feeds on *Candaha Indica*.

PUPA.—Very much bent back, far more so than in *Terias*, the head prolonged into a long thin recurved beak. When first formed it is pale green, but becomes a greyish-white marbled more or less with brown. (Davidson in Sharpe's Monograph Gen. *Teracolus*, p. 101.)

## CALLOSUNE ETRIDA.

Plate 594, figs. 1, ♂, 1a, ♀, 1b, ♂, 1c, ♀ (Wet-season Brood = *Pernotatus*), 1d, ♂, 1e, ♀ (Intermediate Brood), 1f, ♂, 1g, ♀, 1h, ♂, 1i, ♀ (Dry-season Brood), 1j, ♂, 1k, ♀ (Winter Form = *Biimbura*), 1l, ♂, 1m, ♀ (Extreme Dry-season Brood).

*Anthocharis Etrida*, Boisduval, Spéc. Gen. Lep. i. p. 576 (1836).

*Callosune Etrida*, Moore, Cat. Lep. E.I.C. 1857, p. 69. Wallace, Trans. Ent. Soc. 1867, p. 390. Swinhoe, Journ. Bo. Nat. Hist. Soc. 1887, p. 278. Hampson, Journ. As. Soc. Bengal, 1888, p. 362. Mackinnon and de Nicéville, Journ. Bo. Nat. Hist. Soc. 1898, p. 591.

*Teracolus Etrida*, Butler, Proc. Zool. Soc. 1870, p. 726; id. 1876, p. 160. Swinhoe, Proc. Zool. Soc. 1884, p. 510; id. 1885, p. 144. Aitken, Journ. Bo. Nat. Hist. Soc. 1887, p. 38. Watson, Journ. Bo. Nat. Hist. Soc. 1890, p. 36; id. 1894, p. 522. Davidson, Bell and Aitken, Journ. Bo. Nat. Hist. Soc. 1890, p. 359; id. 1897, p. 572. de Nicéville, Journ. Bo. Nat. Hist. Soc. 1890, p. 359. Guy Marshall (part), Proc. Zool. Soc. 1897, p. 144. Butler, Ann. Mag. Nat. Hist. 1897, p. 456. Mackinnon and de Nicéville, Journ. Bo. Nat. Hist. Soc. 1898, p. 591. Sharpe, Monograph, Gen. *Teracolus*, i. p. 104, pl. 33, figs. 1, 1a to 1m (1898). Nurse, Journ. Bo. Nat. Hist. Soc. 1899, p. 513. de Rhé-Philippe, Journ. Bo. Nat. Hist. Soc. 1902, p. 492. Aitken and Comber, Journ. Bo. Nat. Hist. Soc. 1903, p. 51.

*Colotis Etrida*, Bingham, Fauna of Brit. India, Butt. ii. p. 270 (1907).

*Teracolus Pernotatus*, Butler, Proc. Zool. Soc. 1876, p. 159, pl. 7, fig. 1, ♂ ♀.

*Teracolus Farrinus*, Butler, l.c. fig. 2, ♂ ♀; id. 1886, p. 373.

*Callosune Farrina*, Moore, Proc. Zool. Soc. 1882, p. 254.

*Teracolus Purus*, Butler, l.c. p. 370, figs. 14, ♂, 15, ♀; id. 1881, p. 610; id. 1886, p. 374; id. Ann. Mag. Nat. Hist. 1888, p. 200.

*Callosune Pura*, Moore, Proc. Zool. Soc. 1882, p. 254.

*Teracolus Casimirus*, Butler, l.c. fig. 5, ♂ ♀.

*Teracolus Biimbura*, Butler, l.c. figs. 3, 4, ♂ ♀; id. 1881, p. 609. Swinhoe, Proc. Zool. Soc. 1884, p. 511; id. 1885, p. 144; id. 1886, p. 433.

## Wet-season Brood (Figs. 1, 1a, 1b, 1c, ♂ ♀).

IMAGO.—Male. Upperside white, the basal portion irrorated with grey scales. *Forewing* with the costal line blackish, a black dot at the end of the cell, an orange-red apical patch divided by the black veins, much narrower than in *Eucharis*, being broadly bordered on both sides with black, the bands meeting hindwards and narrowing to a point on the lower angle of the wing. *Hindwing* with a blackish spot on the costa beyond the middle, and large black angulated spots on the veins on the outer border, the discal band of the underside showing through the wing. Underside white. *Forewing* with the cell spot more pronounced, the orange patch showing through the wing, bordered inwardly by a well-marked broad band from the costa, usually extending only to vein 4. *Hindwing* with a black dot at the end of the cell, generally with a pinkish mark on its inner side, and a discal brown macular whorl, often dislocated, the outer marginal spots often showing through the wing. *Antennæ* blackish-brown, with

white bands above, whitish beneath. Head, thorax and abdomen black above, with short greyish hairs, white beneath. Palpi black above, white beneath.

Female. Upperside white, more densely irrorated with grey scales, all the markings darker and larger. *Forewing* with the cell spot often fairly large, the orange at the apex much reduced, the black bands being much deeper, a discal row of black spots, generally three, two large ones below veins 4 and 2 and a small one between them. *Hindwing* with two black spots from the costa beyond the middle, the whorl completed with fainter coloured spots, the black marginal spots larger than in the male. Underside as in the male, but there is a discal macular band or whorl of spots on both wings, often incomplete on the forewing.

Expanse, ♂ ♀  $1\frac{8}{10}$  inches.

Intermediate Brood (Figs. 1d, 1e, ♂ ♀ = *Farrinus*).

Male. Upperside white, the grey scaling less. *Forewing* with the orange patch larger, the black border being narrower. *Hindwing* with the spots on the exterior margin smaller, the discal band not visible. Underside as in the Wet-season form, but all the markings paler.

Female. Upperside as in the Wet-season form, with all the markings reduced, the discal band on the forewing composed of only two spots, the cell spot reduced to a dot. *Hindwing* with the spots on the exterior margin smaller, a large spot below the costa beyond the middle, the rest of the discal band not visible. Underside as in the Wet-season form, but all the markings paler.

Expanse, ♂ ♀  $1\frac{7}{10}$  to  $1\frac{8}{10}$  inches.

Dry-season Brood (Figs. 1f, 1g, 1h, 1i, ♂ ♀ = *Etrida*).

Male. Usually smaller than the preceding and whiter. *Forewing* with the orange-red apical patch larger, the black bands narrower and not extended hindwards to the angle. *Hindwing* with the black spots on the exterior margin much reduced in size. Underside white. *Forewing* with a dot at the end of the cell, the orange patch showing through the wing, margined inwardly by a pale blackish bar from the costa, usually ending before reaching vein 4. *Hindwing* sometimes slightly tinged with reddish-ochreous, a dot at the end of the cell, indications more or less pronounced of the discal whorl, generally dislocated and incomplete, sometimes absent (= *Purus*).

Female. Like the male, but on the upperside of the forewing the spot at the end of the cell is larger. There is usually a spot in the disc below vein 4 and another below vein 2; sometimes one or other of these spots is absent. *Hindwing* with the spots on the exterior margin much as in the Intermediate form. Underside. *Forewing* white, the apical patch showing through the wing, a spot at the end of the cell, and two discal spots. *Hindwing* generally with a slight pinkish tinge, a dot at the end of the cell;

sometimes indications of the discal whorl, often not visible, sometimes with indications of the marginal spots, sometimes without them.

Expanse, ♂ ♀  $1\frac{6}{10}$  to  $1\frac{7}{10}$  inches.

Winter Form (Figs. 1j, 1k = *Bimbura*).

Only differs from the Dry-season form in having the underside of the hindwings in both sexes suffused with pink, usually very strongly suffused when first emerged, when at rest the greater portion of the forewing is hidden by the hindwing. The creature goes to rest on the tops of the bushes, the leaves of which are pink-tinged at their ends, and thus becomes invisible. We have often watched them settling in this manner of an evening.

Extreme Dry-season Form (Figs. 1l to 1m).

Male. Upperside pure white, the apical patch as in the Dry-season form. *Hindwing* with the spots on the exterior border reduced to dots, often absent. Underside sometimes with both wings pure white, sometimes the hindwing is slightly tinged with pink, generally a minute dot at the end of each cell, some of the usual spots occasionally indicated, often the wings are immaculate, some of the examples are very small.

Expanse, ♂ ♀  $1\frac{1}{10}$  to  $1\frac{3}{10}$  inches.

LARVA.—Nearly cylindrical, slender, and of a uniform green colour, with the rough surface characteristic of *Catopsilia* and *Terias*.

PUPA.—With a sharp transverse ridge above, at the junction of the thorax and abdomen, which extends well beyond the general outline on each side, forming a pointed lateral process; from this a dorsal ridge runs out into a similar point just over and behind the head; the colour is light green, with a triangular patch of yellowish-white on the anterior side of each lateral process, and a similar patch covering the top of the head. Aitken (Journ. Bo. Nat. Hist. Soc. 1887, p. 38.)

HABITAT.—All India except Bengal.

DISTRIBUTION.—It is to be found in the desert and sandy tracts as well as in cultivated land and the outskirts of forests. We have the species from Campbellpur, Deesa, Neemuch, Rawul Pindi, Mhow, Ahmedabad, Nilgiris, from many localities in the Bombay district, and from Sind right up to Sukkur; de Nicéville reports it from Simla and Agra; Davidson from Kanara and Khandesh, and it is in the British Museum from Mean Meer and Cashmire. It is very curious that its capture seems never to have been reported from any part of Bengal Proper.

## CALLOSUNE LIMBATA.

Plate 595, figs. 1, ♂, 1a, ♀ (Wet-season Form).

*Teracolus Limbatus*, Butler, Proc. Zool. Soc. 1876, p. 161. Watson, Journ. Bo. Nat. Hist. Soc. 1894, p. 522. Butler, Ann. Mag. Nat. Hist. 1897, p. 456. Sharpe, Mon. Gen. *Teracolus*, i. p. 110, pl. 34, figs. 1, 1a to 1g (1898).

*Callosune Limbatus*, Moore, Lep. Ceylon, i. p. 129, pl. 49, fig. 5 (1881).

*Colotis Limbatus*, Bingham, Fauna of Brit. India, Butt. ii. p. 271 (1907).

*Teracolus Etrida*, Guy Marshall (part), Proc. Zool. Soc. 1897, p. 26.

## Wet-season Brood.

IMAGO.—Male. Upperside white, with basal portion irrorated with grey scales. *Forewing* costal line black, orange-red apical patch divided by the veins, the outer and inner black borders broad, meeting thickly together hindwards to the lower angle of the wing. *Hindwing* with a broad continuous black marginal band, in some examples diffused inwards, in others without the diffusion, and sometimes the band is composed of large black spots joined together. Underside much as in the Wet-season form of *Etrida*.

Female. Upperside very similar to the male. *Forewing* with a small black spot at the end of the cell, and the two usual discal spots, these are sometimes very small and sometimes absent. *Hindwing* with the outer black band much as in the male, a small black spot below the costa beyond its middle. Underside white, the costal margin, basal area, apical patch, and hind margin greenish-yellow, of various shades in different examples; the markings as in *Etrida*.

Expanse, ♂ 1 $\frac{5}{10}$  to 1 $\frac{6}{10}$  inches.

## Dry-season Brood.

Male. Upperside white, the grey irrorations less than in the Wet-season form. *Forewing* with the costal line paler, the orange apical patch a little larger, the black bands on each side being narrower, the inner band narrowing upwards, the two bands meeting hindwards and fining down to a line on the lower angle of the wing. *Hindwing* with black marginal spots as in *Etrida*. Underside white tinted with pale yellowish towards the base of both wings, the apical patch of the forewing showing through the wing, a black spot at the end of each cell, largest on the hindwing and touched with pink, the wing otherwise immaculate.

Female very similar to the male. *Forewing* with a black dot at the end of the cell, and one, sometimes two, black discal dots. Underside like the underside of a Dry-season form female *Etrida*.

Expanse, ♂ 1 $\frac{4}{10}$  to 1 $\frac{5}{10}$  inches.

HABITAT.—Ceylon.

DISTRIBUTION.—We have it from Trincomali, it is in the British Museum from Puttalam, Hambantotte, and Vavoniya Vilankulam.

## CALLOSUNE DANAË.

Plate 595, figs. 2, ♂, 2a, ♀, 2b, ♂, 2c, ♀ (Wet-season Brood), 3, ♂, 3a, ♀ (Dry-season Brood = *Sanguinalis*), 4, ♂, 4a, ♀, 4b, ♂, 4c, ♀ (Extreme Dry-season Brood = *Taplini*).

*Papilio Danaë*, Fabricius, Syst. Ent. p. 476 (1775). Donovan, Ins. Ind. pl. 26, fig. 2, ♂ (1800).

*Callosune Danaë*, Moore, Catal. Lep. E.I.C. i. p. 69 (1857). Wallace, Trans. Ent. Soc. 1867, p. 389.

Moore, Lep. Ceylon, i. p. 129 (1881). Hampson, Journ. As. Soc. Bengal, 1888, p. 362.

*Teracolus Danaë*, Butler, Proc. Zool. Soc. 1876, p. 157. Swinhoe, Proc. Zool. Soc. 1885, p. 143.

Watson, Journ. Bo. Nat. Hist. Soc. 1890, p. 36; id. (part) 1894, p. 521. Butler, Ann. Mag. Nat. Hist. 1897, p. 498. Guy Marshall (part), Proc. Zool. Soc. 1897, p. 22. Aitken and Comber, Journ. Bo. Nat. Hist. Soc. 1903, p. 51.

*Colotis Danaë*, Bingham (part), Fauna of Brit. India, Butt. ii. p. 271 (1907).

*Teracolus Sanguinalis*, Butler, Proc. Zool. Soc. 1876, p. 158.

*Callosune Sanguinalis*, Moore, Lep. Ceylon, i. p. 129 (1881).

*Callosune Taplini*, Swinhoe, Proc. Zool. Soc. 1884, p. 444, pl. 40, figs. 8, ♂, 9, ♀; id. 1885, p. 144.

## Wet-season Form (Figs. 2, ♂, 2a, ♀, 2b, ♂, 2c, ♀).

IMAGO.—Male. White, rather thickly irrorated with blackish-grey scales towards the base. *Forewing*, costa from base to the apical patch with a broad black band, a black spot at the end of the cell; apical patch large, carmine, edged on the costa and outer side by a narrow black band, the outer band with angular spots on the veins; the inner black band is broad, is somewhat suffused inwardly and widens hindward, and is continued to the lower angle of the wing. *Hindwing* with a broad black band on the exterior margin, more or less macular hindwards. Underside white, sparsely covered with grey scales. *Forewing* with a black spot at the end of the cell, the apical portion with pale rosy tinge, a band of pale carmine across its middle containing a whorl of black spots with white centres, some grey marks on the outer margin, followed by two large blackish square spots on the interspaces below veins 3 and 2. *Hindwing* with a black spot with a carmine centre at the end of the cell, a discal macular complete band or whorl right across the wing, the spots decreasing in size hindward, and each containing faint traces of pale carmine inside them, the outer black border faintly visible through the wing.

Female. Upperside white, with the basal third very thickly irrorated with blackish-grey scales, a black spot at the end of the cell, costal line black, the apical patch very nearly as brightly coloured as in the male, but smaller, its outer and inner black margins being deeper, the former running in acute angles inwards on the veins, the inner band thickened hindwards and continued broadly to the lower angle, a whorl of four or five black spots across the middle of the patch. *Hindwing* with a broad black band on the exterior border as in the male, a square black spot near the costa beyond the middle, being the commencement of the discal macular band, the spots of which are less pronounced hindwards. Underside like the underside of the male, but

all the markings brighter and deeper in colour, the spots larger, the carmine band across the apical portion of the forewing broader, the cell spot with a crimson centre; the spots of the discal band of the hindwing well marked with crimson and the exterior margin with pale blackish spots on the vein ends.

Expanse, ♂ ♀  $1\frac{8}{10}$  inches.

Dry-season Brood (Figs. 3, ♂, 3a, ♀).

Male. Upperside white. *Forewing* more acuminate than in Wet-season form, costal line dark, apical patch bright carmine, the costal and outer black borders narrow, the inner border also much narrower, a black dot at the end of the cell. *Hindwing* with a small blackish-brown spot below the costa beyond the middle, and a narrow black somewhat macular band on the exterior margin. Underside white. *Forewing* with the apical portion tinged with pale carmine, with a whorl of brown spots with pale centres across its middle. *Hindwing* slightly tinged with pink, a pale pinkish spot at the end of the cell, and a discal band of pinkish spots.

Female. Upperside white, the basal portion irrorated with grey scales. *Forewing* with the carmine apical patch nearly as large as in the male, the outer band deeper, the inner band scarcely indicated, the patch crossed by a whorl of black spots joined together, the lowest the largest. *Hindwing* with the band on the exterior border broader than in the male, the discal band composed of small spots. Underside. *Forewing* white, suffused with pinkish-yellow scales on the basal portion, the apical portion pale carmine, the band of spots across it more pronounced than in the male, a spot at the end of the cell. *Hindwing* suffused with pinkish-yellow, the spot at the end of the cell and the discal whorl of spots larger.

Expanse, ♂ ♀  $1\frac{6}{10}$  to  $1\frac{7}{10}$  inches.

Extreme Dry-season Brood (Figs. 4, ♂, 4a, ♀, 4b, ♂, 4c, ♀).

Male. Upperside white. *Forewing* with the costal margin with grey scales, the carmine apical patch large, the costal and outer margins merely a line of black, the inner margin thin and somewhat suffused; a black dot at the end of the cell in some examples. *Hindwing* with some small blackish spots at the end of the veins on the exterior margin. Underside. *Forewing* white, with the carmine apical patch showing through the wing, the whorl of brown spots across its middle small, a dot at the end of the cell. *Hindwing* generally tinted with pink, sometimes pure white, a dot at the end of the cell, and a discal whorl of small brown spots.

Female. Upperside white, suffused with grey scales on the basal portion. *Forewing* with a black dot at the end of the cell, carmine apical patch rather smaller than in the male; its outer band somewhat broader and thicker hindward, the whorl across the middle of the patch ending hindwards in a large spot, in some examples

the inner side of the patch has no black markings. *Hindwing* with a row of small discal spots and blackish spots on the exterior border on the veins. Underside. *Forewing* with a spot at the end of the cell, the crimson patch showing through the wing, with a whorl of blackish spots across its middle. *Hindwing* much as in the male, but tinged with pink.

Expanse, ♂ ♀  $1\frac{6}{10}$  inches.

HABITAT.—Ceylon and Southern India.

DISTRIBUTION.—Taken by us at Bombay, Nagar, Khandesh and Bangalore; Watson records it from Mysore, and Hampson from the Nilgiris.

#### CALLOSUNE DULCIS.

Plate 596, figs. 1, ♂, 1a, ♀, 1b, ♂, 1c, ♀ (Wet-season Brood = *Eboreoides*), 1d, ♂, 1e, ♀, 1f, ♀ (Intermediate Form = *Dirus*), 1g (Immaculate Form = *Immaculatus*), 1h, ♂, 1i, ♀, 1j, ♂, 1k, ♀ (Dry-season Brood = *Dulcis*).

*Teracolus Dulcis*, Butler, Proc. Zool. Soc. 1876, p. 157, pl. 7, fig. 13, ♂ ♀; id. 1881, p. 610. Swinhoe, Proc. Zool. Soc. 1884, p. 509.

*Callosune Dulcis*, Swinhoe, Journ. Bo. Nat. Hist. Soc. 1887, p. 277.

*Teracolus Dirus*, Butler, Proc. Zool. Soc. 1876, p. 157, pl. 7, fig. 11, ♂ ♀; id. Ann. Mag. Nat. Hist. 1880, p. 222; id. Proc. Zool. Soc. 1881, p. 610.

*Teracolus Eboreoides*, Butler, Proc. Zool. Soc. 1876, p. 158, pl. 7, fig. 12, ♂ ♀.

*Teracolus Immaculatus*, Swinhoe, Proc. Zool. Soc. 1884, p. 443; id. p. 510.

*Teracolus Danaë*, Watson (part), Journ. Bo. Nat. Hist. Soc. 1894, p. 521. Nurse (nec Fabricius), Journ. Bo. Nat. Hist. Soc. 1899, p. 513.

*Teracolus Eupompe*, Guy Marshall (part), Proc. Zool. Soc. 1897, p. 22.

*Colotis Danaë*, Bingham (part), Fauna of Brit. India, Butt. ii. p. 271 (1907).

#### Wet-season Brood (Figs. 1, ♂, 1a, ♀, 1b, ♂, 1c, ♀).

IMAGO.—A desert insect.—Male. Upperside white. *Forewing* with thick grey scales on the basal fourth, costal line black, apical carmine patch smaller than in *Danaë*, the outer and costal black margins about as broad, the inner margin much broader, narrowing hindward, to the lower angle, a black dot at the end of the cell. *Hindwing* white, the grey scales at the base less pronounced, the black band on the exterior border composed of large angulated spots on the veins, more or less touching each other. Underside white. *Forewing* with a black spot at the end of the cell, generally with a pale centre, the carmine colour faintly showing through at the apical portion, a whorl of well pronounced black almost square spots across its middle, some short blackish streaks on the outer border, two, sometimes three, large blackish spots hindwards, the lowest usually much smaller than the other two. *Hindwing* with two small black spots with crimson between them at the end of the cell, a discal whorl of duplicate blackish spots and some short blackish marginal streaks on the veins; outer marginal line on both wings black, cilia white.

Female. White, with the basal third of both wings heavily irrorated with dark grey scales, the scaling outwardly, abruptly terminating. *Forewing* with a large round black spot at the end of the cell; apical band black with four or five spear-shaped carmine streaks across its middle, its inner margin sinuous and sometimes tinged with carmine, and curves towards the outer margin at vein 2 and is continued to the lower angle; a large bifid blackish spot in the middle of the internomedian interspace and a small one in the interspace below the curve. *Hindwing* with the black outer marginal band more or less macular, but very broad, a discal whorl of blackish spots. Underside with the basal third of the forewing and the whole surface of the hindwing suffused with pinkish-yellow, the markings much as in the male, but the spot in the internomedian interspace on the forewing is present, and generally two additional large blackish spots, one in the cell and the other below it; on the hindwing the cell spot and the spots composing the discal band are well marked with carmine.

Expanse, ♂ ♀  $1\frac{9}{10}$  to 2 inches.

Intermediate Form (Figs. 1d, ♂, 1e, ♀, 1f, ♂).

Male. Upperside as in the Wet-season brood. Underside with all the markings smaller, the discal whorl of spots on the hindwing small and decreasing hindwards, generally obsolescent after vein 4.

Female. Much as in the Wet-season brood, the carmine apical streaks of the forewing larger, the other markings above and below less pronounced.

The form *Immaculatus*, fig. 1g, is merely a varietal form of *Dirus* not uncommon, in which the discal band of the hindwing below is entirely absent.

Expanse,  $1\frac{9}{10}$  to 2 inches.

Dry-season Brood (Figs. 1h, ♂, 1i, ♀, 1j, ♂, 1k, ♀).

Male. Upperside white, some basal grey irrorations on the forewing, none on the hindwing. *Forewing* with the costal black line very narrow, a black dot at the end of the cell, the carmine apical patch larger than in the other forms, all the black borders being very narrow. *Hindwing* with small black spots at the ends of the veins on the exterior border. Underside white, the apical carmine patch of the forewing showing through, all the spots very small, the discal whorl of spots on the hindwing very small and incomplete.

Female. Upperside like the females of the other forms, but the basal irrorations much paler and all the spots smaller and paler, the carmine apical patch of the forewing much larger, the bands being very narrow. Underside white, basal irrorations sparse, often hardly visible, the spots small and with a pink tinge.

Expanse, ♂ ♀  $1\frac{5}{10}$  to  $1\frac{7}{10}$  inches.

HABITAT.—The desert and sandy tracts of Western India.

DISTRIBUTION.—Taken by us in Karachi, Hyderabad, Sukkur, all in Sind, where it is in great numbers, also at Deesa in Rajputana, near Ahmedabad in Guzerat, and Nurse reports it from Kutch Bhoj.

#### CALLOSUNE SUBROSEUS.

Plate 597, figs 1, ♂, 1a, ♀, 1b, ♂, 1c, ♀ (Dry-season Brood = *Alberta*), 1d, ♂, 1e, ♀, 1f, ♂, 1g, ♀ (Wet-season Brood = *Subroseus*), 1h, ♂, 1i, ♀ (Extreme Dry-season Brood).

*Teracolus Subroseus*, Swinhoe, Proc. Zool. Soc. 1884, p. 443, pl. 40, figs. 6, ♂, 7, ♀; id. p. 510.

*Callosune Subroseus*, Swinhoe, Journ. Bo. Nat. Hist. Soc. 1887, p. 277.

*Callosune Alberta*, Swinhoe, Ann. Mag. Nat. Hist. 1890, p. 356.

*Teracolus Danaë*, Watson (part), Journ. Bo. Nat. Hist. Soc. 1894, p. 521.

*Teracolus Eupompe*, Guy Marshall (part), Proc. Zool. Soc. 1897, p. 22.

*Colotis Danaë*, Bingham (part), Fauna of Brit. India, Butt. ii. p. 271 (1907).

Dry-season Brood (Figs. 1, ♂, 1a, ♀, 1b, ♂, 1c, ♀).

IMAGO.—Male. Upperside white, with some few grey and yellow scales at the base. *Forewing* with a black dot at the end of the cell, costal line black, carmine apical patch somewhat smaller than in *Dulcis*, costal and outer black borders narrow, inner border much as in the Dry-season form of that species, not usually produced hindwards lower than vein 2. *Hindwing* with black spots at the vein ends on the exterior border. Underside. *Forewing* white, a black dot at the end of the cell, apical portion broad and of a rosy flesh colour, crossed in its middle by a whorl of pinkish-brown spots with pale centres. *Hindwing* dark rosy with a lilac tinge, a bifid red-brown spot at the end of the cell, sometimes with pink or red between them, and a discal band of red-brown spots with pale centres, decreasing in size hindwards, no other markings.

Female. Upperside like a female of the Dry-season form of *Dulcis*. Underside like the male, the lilac rosy tinge more pronounced. *Forewing* with the cell spot large, the apical band of spots with the lowest large, a dot often below it and a large almost square brown spot in the middle of the internomedian interspace. *Hindwing* as in the male. *Palpi* above, head and thorax covered with short reddish-ochreous hairs.

Expanse, ♂ ♀  $1\frac{7}{10}$  to  $1\frac{8}{10}$  inches.

Wet-season Brood (Figs. 1d, ♂, 1e, ♀, 1f, ♂, 1g, ♀).

Male and Female. Very similar to the Dry-season brood, but the rosy suffusion beneath is much paler and has no lilac tinge.

Expanse, ♂ ♀  $1\frac{7}{10}$  to  $1\frac{8}{10}$  inches.

Extreme Dry-season Brood (Figs. 1h, ♂, 1i, ♀).

Male and Female. Upperside like a small example of the other form, the spots on the exterior margin of the *Hindwing* quite small. Underside. Male. Both wings pure

white, the apical rosy area small and very pale, the spots minute in the *Forewing* mostly obliterated in the *Hindwing*. Female. *Forewing* white. *Hindwing* sometimes pure white, sometimes faintly tinged with rosy, all the markings pale and small.

Expanse, ♂ ♀  $1\frac{5}{10}$  to  $1\frac{7}{10}$  inches.

HABITAT.—Sind.

DISTRIBUTION.—We took the Dry-season form at Karachi in October and November, and what we call the Wet-season form, for the want of a better expression, in nearly every other month of the year. We have it also from Sukkur.

#### Genus COLOTIS.

*Colotis*, Hübner, Verz. bek. Schmett. p. 97 (1816). Kirby in Allen's Nat. Hist. Lep. ii. p. 198 (1896)  
Bingham (part), Fauna of Brit. India, Butt. ii. p. 259 (1907).

*Mancipium*, Horsfield, Cat. Lep. E.I.C. 1829, p. 141.

*Idmais*, Boisduval (part), Spéc. Gen. Lep. i. p. 584 (1836). Doubleday, Gen. Diurnal, Lep. p. 5 (1847).

Wings small. *Forewing* a little elongated, more or less triangular, costal margin straighter with the apex more acuminate than in *Callosune*; costal vein extending to half the margin, neuration as in *Callosune*, fore tarsi short in female; general coloration and pattern white, or salmon-pink with broad outer marginal black borders to both wings; sex marks slight, variable, sometimes not distinguishable.

Type, *C. Amata*, Fabr., from Africa.

NOTE.—*Cypræa*, *Dynamine*, *Modestus*, *Protractus* and *Phisadia* belong to the salmon-pink group, and *Vestalis* and the others to the white groups, all the species of the genus having black borders to both wings. Watson and Bingham have sunk the three first with *Calais* to the type form *Amata* from Africa, but though superficially resembling each other to some extent, the fact that *Cypræa* and *Modestus* are forest and garden insects and *Dynamine* belongs exclusively to desert tracts and sandy districts is sufficient evidence to show they cannot be one and the same species, besides which we possess seasonal forms of all three. During all the years we were collecting in Bombay and the forest and garden lands along the coast we never took a single example of *Dynamine*; nor similarly, after many months collecting in Karachi where *Dynamine* in all its seasonal forms was common, or in any part of Sind from Sukkur to the coast, did we ever capture a single example resembling either *Cypræa* or *Modestus*. *Cypræa*, *Modestus* and *Dynamine* have in the male a patch of specialized scales on the upper side of the *Hindwing*, extending from the subcostal vein to the costal margin, no glandular patch on the *Forewing*, but the lower margin is slightly convex. All the other Indian forms have a small glandular patch on the upperside of the *Forewing* above the median nervure. All the different forms of the

*Cypræa* group superficially much resemble each other, the Indian *Cypræa* is in resemblance nearest to the African *Amata*, the Dry-season form of the Arabian and Indian *Dynamine (Carnifer)* somewhat resembles the African *Calais*, but are not nearly so brightly coloured, there are distinctive differences pointed out by Boisduval (Spéc. Gen. p. 588), and considering the different quarters of the globe in which they occur we prefer to keep the Indian forms separate from the African.

#### COLOTIS CYPRÆA.

Plate 598, figs. 1, ♂, 1a, ♀, 1b, ♂, 1c, ♀ (Wet-season Brood), 1d, ♀ (Albino), 1e, ♂, 1f, ♀ (Dry-season Brood = *Kennedii*).

*Papilio Cypræa*, Fabricius, Mant. Ins. ii. p. 22 (1787).

*Idmais Calais*, Moore (nec Cramer), Cat. Lep. E.I.C. i. p. 67 (1857).

*Teracolus Cypræa*, Butler, Proc. Zool. Soc. 1876, p. 138. Swinhoe, Proc. Zool. Soc. 1885, p. 143.

Aitken, Journ. Bo. Nat. Hist. Soc. 1887, p. 39. Davidson and Aitken, id. 1890, p. 359.

*Teracolus Amata*, Butler (nec Fabricius), Proc. Zool. Soc. 1876, p. 138. Watson, Journ. Bo. Nat. Hist. Soc. 1890, p. 36. Davidson, Bell and Aitken, Journ. Bo. Nat. Hist. Soc. 1897, p. 572. Guy Marshall (part), Proc. Zool. Soc. 1897, p. 9. Sharpe (part), Monog. Genus *Teracolus*, i. p. 5, pl. 1, figs. 2, 2a, 2b (1898).

*Idmais Amata*, Hampson, Journ. As. Soc. Bengal, 1888, p. 362.

*Teracolus Kennedii*, Swinhoe, Proc. Zool. Soc. 1884, p. 440; id. 1885, p. 143.

*Teracolus Calais*, Aitken and Comber, Journ. Bo. Nat. Hist. Soc. 1903, p. 50.

*Colotis Amata*, Bingham, Fauna of Brit. India, Butt. ii. p. 261 (1907).

#### Wet-season Brood (Figs. 1, ♂, 1a, ♀, 1b, ♂, 1c, ♀).

**IMAGO.** A forest and garden insect. Male. Upperside salmon-pink. *Forewing* with a broad black costal band reaching the sub-costal vein, irrorated with salmon-pink scales on the basal portion, a black spot, often like a bar from this band, half way across the end of the cell, thick black irrorations at the base of the wing, the apical third black, its inner margin sinuous and curved, with two teeth on veins 2 and 3, continued hindwards to the lower angle, a large black spot a little inwards, touching the lower tooth, making a large bifid spot of the ground colour, a little above the lower margin, the apical portion crossed by a whorl of three or four or more spots of the ground colour and sometimes some sub-marginal short streaks near the apex, and some spots below it. *Hindwing* with black irrorations thickly down the abdominal marginal third of the wing, a broad black costal band, a narrower black band on the exterior border, often marked with pinkish close to the marginal line, some inner, somewhat spear-shaped black spots, which leave large spots of the ground colour between them and the band; cilia of both wings white. Underside pale ochreous tinged with salmon colour. *Forewing* with a pale cell spot and all the bands and spots showing through the wing, and two large prominent, nearly square black spots, on the disc, below veins

2 and 3. *Hindwing* irrorated with black and grey scales, a black dot at the end of the cell, the discal spots showing through the wing.

Female. Above and below similar to the male, but paler in colour, the costal black band of the hindwing above is absent, and all the salmon-coloured spots on both wings are larger; hindwing below with a large cell spot and a discal whorl of grey conjoined spots; there are also many Albinos (fig. 1d).

Expanse, ♂ ♀  $1\frac{8}{10}$  inches.

Dry-season Brood (Figs. 1e, ♂, 1f, ♀).

Male. Coloured above and below much as in the other form, but the black band round the wings is much narrower and the black spot above the lower margin near the angle is disconnected from the marginal band.

Female. Paler than the male, often whitish, not differing from the markings of the male except in the absence as usual of the costal band on the hindwing.

Expanse, ♂ ♀  $1\frac{7}{10}$  inches.

LARVA feeds on *Avicennia Tomontosa*, called by the natives *Sairi*; it is slender, cylindrical and rough in the upper surface like the larva of *Terias*; on examination with a strong lens, this roughness proves to be due to minute tubercles on each of which grows a short black bristle; each side above the base of the legs is fringed with somewhat longer white hairs; the colour is grass-green above, with a dark blue dorsal line very narrowly bordered with yellow; the underside is paler bottle-green, a lateral yellowish line separating the two tints.

PUPA very similar in form to that of *Terias*, and of a dingy whitey-brown colour. The aspect of this pupa confirms my general impression that this species is much nearer to *Terias* than to some of the species with which it has been lumped under the name *Teracolus* (Aitken, Journ. Bo. Nat. Hist. Soc. 1887, p. 39).

Davidson's description of larva and pupa is very similar (Journ. Bo. Nat. Hist. Soc. 1890, p. 359, and 1897, p. 572), except that he found the larva feeding on *Salcadora Persica*, and that the pupa is suspended by the tail, like the pupa of *Terias*, with a moderately long band.

HABITAT.—Southern India.

DISTRIBUTION.—We have it from Bombay, Poona, Ahmednuggar and Karwar; it is in the B. M. from Nasic, Bangalore and Kolar; Hampson records it from the Nilgiris, Watson from Mysore.

#### COLOTIS MODESTUS.

Plate 598, figs. 3, ♂, 3a, ♀ (Wet-season Brood), 3b, ♂ (Dry-season Brood).

*Teracolus Modestus*, Butler, Proc. Zool. Soc. 1876, p. 137. Watson, Journ. Bo. Nat. Hist. Soc. 1894, p. 520.

*Idmais Modestus*, Moore, Lep. Ceylon, i. p. 131, pl. 49, figs. 2, ♂, 2a, ♀ (1881).

*Teracolus Amatus*, Guy Marshall (part), Proc. Zool. Soc. 1897, p. 9. Sharpe, Monog. Gen. *Teracolus*, i. p. 5 (1898).

*Colotis Amata*, Bingham (part), Fauna of Brit. India, Butt. ii. p. 261 (1907).

Wet-season Brood (Figs. 3, ♂, 3a, ♀).

IMAGO. Male. Upperside paler salmon-pink than in *Cypræa*, the apex more produced. *Forewing* with the outer black band broader, the spots inside the band smaller, the inner margin of the band feebly sinuated inwardly between the veins, and barely enclosing a spot of the ground colour below vein 2, a black dentate spot at the end of the cell touching the costal band. *Hindwing* with the outer band broader and more complete than in *Cypræa* and inwardly traversed by a row of small grey bordered spots of the ground colour. Underside pale salmon-yellow, a black dot at the end of each cell, the upper markings more or less visible through the wings, and the two discal black spots on the forewing well pronounced.

Female. Upperside generally white, sometimes tinged with salmon-pink, but the coloured females are much rarer than the white ones; the black bands on both wings broader usually than in the males, the spots on the band usually larger and more numerous and complete, the black spot at the end of the cell of the forewing larger, the basal area thickly irrorated and more extensive; underside tinged with grey, more or less ochreous-tinged along the borders of the forewing and the whole of the hindwing, which has a large cell spot and a discal band of conjoined pinky-grey spots.

Expanse, ♂ ♀  $1\frac{8}{10}$  to  $1\frac{9}{10}$  inches.

Dry-season Brood (Fig. 3b, ♂).

Both sexes similar to the Wet-season form, but all the bands narrower and the spots smaller.

Expanse, ♂ ♀  $1\frac{5}{10}$  to  $1\frac{6}{10}$  inches.

HABITAT.—Ceylon.

DISTRIBUTION.—In our collection from Colombo and Trincomali; found by Wade and Mackwood in Dambool, Hambantotte, and Mulliatim District.

COLOTIS DYNAMINE.

Plate 598, figs. 2, ♂, 2a, ♀ (Wet-season Brood), 2b, ♀, 2c, ♀ (Dry-season Brood = *Carnifer*).

*Pontia Dynamine*, Klug, Symb. Phys. pl. 6, figs. 17, 18, ♂ (1829).

*Idmais Dynamine*, Boisduval, Spéc. Gen. Lep. i. p. 588 (1836). Swinhoe, Journ. Bo. Nat. Hist. Soc. 1887, p. 277.

*Teracolus Dynamine*, Butler, Proc. Zool. Soc. 1876, p. 138; id. 1881, p. 699. Swinhoe, Proc. Zool. Soc. 1884, p. 509. Aitken, Journ. Bo. Nat. Hist. Soc. 1887, p. 39.

*Teracolus Carnifer*, Butler, Proc. Zool. Soc. 1877, p. 138, pl. 7, figs. 8, 9, ♂. Swinhoe, Proc. Zool. Soc. 1884, p. 509.

*Teracolus Calais*, var. *Dynamine*, Butler, Proc. Zool. Soc. 1896, p. 245.

*Teracolus Calais*, Sharpe (part), Monog. Gen. *Teracolus*, i. p. 1 (1898). Guy Marshall, Proc. Zool. Soc. 1897, p. 9.

*Teracolus Amatus*, Nurse (nec Fabricius), Journ. Bo. Nat. Hist. Soc. 1899, p. 513.

*Colotis Amata*, Bingham (part), Fauna of Brit. India, Butt. ii. p. 261 (1907).

Wet-season Brood (Figs. 2, ♂, 2a, ♀).

IMAGO. Inhabits desert and sandy tracts. Male. Upperside salmon-pink of a duller colour than in either of the preceding forms. *Forewing* with the base suffused with black irrorations, extending somewhat on the median and lower veins, costal band broad, entering the cell, apical portion of the outer band not so broad as in the other forms, its inner margin curved to vein 4, when it is looped twice towards the margin, the lower loop being joined to a large square black spot above the lower margin, leaving a large spot of the ground colour near the angle; the lower portion of the outer band is broad; the apical portion is crossed by a whorl of spots and some submarginal streaks of the ground colour. *Hindwing* with a very broad costal band, the outer band also broad, occupying often a third of the wing, the abdominal marginal third heavily irrorated with black, leaving but a small portion of the centre of the wing salmon-pink, there are usually four or five salmon-pink spots in the marginal band well separated from the margin and some salmon-pink dots close to the margin, cilia brownish with white tips. Underside much as in the other forms, but on the forewing there is a black line across the cell thickened into a spot hindward, and often on the hindwings a distinct indication of a discal whorl of spots.

Female. Upperside duller and paler in colour, sometimes whitish in the discs of both wings. *Forewing* with the basal irrorations usually more extensive, the cell spot much larger than in the male, not infrequently forming part of the costal band and running in with it to the base. *Hindwing* with the discal band of spots in the outer black band usually complete, one in each interspace; no costal band. Underside paler and brighter coloured than in the male. *Forewing* with a salmon-pink suffusion on the basal third, the bands and spots showing very distinctly through the wing. *Hindwing* irrorated with grey atoms, a small pink and red cell spot, and a well-pronounced discal whorl of conjoined pinkish-brown spots.

Expanse, ♂ ♀,  $1\frac{6}{10}$  to  $1\frac{7}{10}$  inches.

Dry-season Brood (Figs. 2b, ♂, 2c ♀).

Male. Upperside salmon-pink, brighter than in the Wet-season form, the basal irrorations lighter and less extensive, the exterior band of the *Hindwing* narrower, its inner portion rapidly paling into the salmon-pink colour of the wing, which consequently covers a much larger space, the spots near the margin larger and more

distinct. Underside coloured as in the other form, but the bands and spots show much more plainly through the wing.

Female. Upperside paler than in the male, sometimes nearly white. *Forewing* generally with bright salmon-pink suffusion on the basal half, the costal band irrorated with yellow scales, not extending beyond the end of the cell, except in a thin costal line, all the spots on the outer border larger and complete, there being usually one in each interspace. *Hindwing* as usual without the costal band, some salmon-pink suffusion towards the base, but less than in the *Forewing*; the exterior black band broad and usually well formed, both rows of spots in it being complete. Underside like that of the Wet-season form, but the outer marginal space in both wings is always paler, and there is usually a very bright salmon-pink suffusion on the basal half of the *Forewing*.

*Expanse*, ♂ ♀  $1\frac{3}{10}$  to  $1\frac{5}{10}$  inches.

HABITAT.—North-Western India, Arabia.

DISTRIBUTION.—We have it from Karachi, where it is in great plenty; we took the Dry-season form in November and December, 1885, and January, 1886, and what we call the Wet-season form in most of the other months of the year; we have the Wet form taken in Hyderabad in July, 1886, from Deesa in Rajputana in July, August, September and October, in Ahmedabad in September, and we have it from Bhooj; Butler records it from Agra, Mynpuri, the Punjab and Kathiawar; we also have many examples of both forms taken by us at Aden.

#### COLOTIS PROTRACTUS.

Plate 599, figs. 1, ♂, 1a, ♀, 1b, ♂.

*Teracolus Protractus*, Butler, Proc. Zool. Soc. 1876, p. 137; id. 1881, p. 609; id. 1886, p. 372.

Swinhoe, Proc. Zool. Soc. 1884, p. 508. Aitken, Journ. Bo. Nat. Hist. Soc. 1887, p. 40.

Butler, Ann. Mag. Nat. Hist. 1888, p. 200; id. 1897, p. 388. Watson, Journ. Bo. Nat. Hist. Soc. 1894, p. 520. Guy Marshall, Proc. Zool. Soc. 1897, p. 10. Sharpe, Monog. Gen. *Teracolus*, i. p. 9, pl. 2, figs. 1, 1a to 1c (1898). Nurse, Journ. Bo. Nat. Hist. Soc. 1899, p. 513.

*Idmais Protractus*, Swinhoe, Journ. Bo. Nat. Hist. Soc. 1887, p. 276.

*Colotis Protractus*, Bingham, Fauna of Brit. India, Butt, ii. p. 263 (1907).

#### Wet-season Brood (Figs. 1 ♂, 1a ♀, 1b ♀).

IMAGO.—Inhabits desert and sandy tracts. Male. Upperside bright salmon-pink, much darker and brighter than in any of the preceding species, and more uniform. *Forewing* with very broad deep black borders, leaving but a little more than the disc down to the lower margin salmon-pink, the basal fourth being densely irrorated with black and blue-grey scales; the costal band comes down to the sub-costal vein, it fills nearly the upper half of the cell, and is joined to the large black spot at the end of the cell, which usually closes it; the apical portion of the outer band is

narrower than the rest, widening gradually hindwards down to the lower margin, and its inner margin is sinuate; across the middle of the apical portion are four or five blue-grey spots, the upper ones the largest. *Hindwing* with the outer band occupying nearly half the wing, the costal space pale greyish, the abdominal marginal space very broadly and densely irrorated with black and blue-grey scales, reducing the salmon-pink central space very much; cilia of both wings white. Underside. *Forewing* pale salmon-pink with four large black spots, one at the end of the cell, and three in a row on the lower disc near the outer margin; the first round and small in the interspace below vein 4; the second in the next interspace a little nearer the margin, larger and square; the third (the largest) in the next interspace, a little inwards, expanding hindwards on to the lower margin. *Hindwing* yellowish with some slight pinkish suffusion inwards, and greenish suffusion outwards, and covered with minute black atoms, no other markings.

Female, like the male, both above and below, but on the upperside the costal band of the forewing and the basal irrorations on both wings are lighter and more irrorated with blue-grey scales; the ground colour is also generally paler, though in some examples it is as dark and bright as in the male; on the underside the inner portion of the *Forewing* is more brightly suffused with salmon-pink, the cell spot and the lowest discal spot larger, and the *Hindwing* is usually uniform pale ochreous-pink; cilia of both sexes pale salmon-pink.

Expanse, ♂ ♀,  $1\frac{7}{10}$  to  $1\frac{8}{10}$  inches.

#### Dry-season Brood.

Male and female much lighter in colour, the borders blackish-brown, instead of deep black, and the sub-apical spots on the forewing whiter, the basal portion of the wings greyer, as is also the costal band of the forewing. Underside suffused with pale pinkish, yellowish towards the base of the forewing, the black spots smaller. *Antennæ* brownish-black, ringed with white, head, thorax and abdomen black; on the underside the palpi, thorax and abdomen are yellow.

Expanse, ♂ ♀  $1\frac{6}{10}$  to  $1\frac{7}{10}$  inches.

#### HABITAT.—North-West India.

DISTRIBUTION.—We have it from Karachi, Hyderabad, and the Hubb River (Sind), also from Bhooj, Deesa in Rajputana, and the Western Jumna Canal, also from Campbellpur, Punjab (Yerbury); it is in the B. M. from Kutch; the type came from the Punjab, Davidson reports it from Kathiawar.

#### COLOTIS PHISADIA.

Plate 599, figs. 2, ♂, 2a, ♀, 2b, ♀, 2c, ♀ (Albino).

*Pieris Phisadia*, Godart, Enc. Méth. ix. p. 132 (1819).

*Idmais Phisadia*, Boisduval, Spéc. Gen. Lep. i. p. 587 (1836). Doubleday, Gen. D. Lep. p. 59 (1847).

*Teracolus Phisadia*, Butler, Proc. Zool. Soc. 1876, p. 136. Swinhoe, Proc. Zool. Soc. 1884, p. 439.  
 Watson, Journ. Bo. Nat. Hist. Soc. 1894, p. 520. Butler, l.c. 1896, p. 245, pl. 10, fig. 13  
 (Pupa). Guy Marshall, Proc. Zool. Soc. 1897, p. 10. Butler, Ann. Mag. Nat. Hist. 1897,  
 p. 389. Sharpe, Monog. Gen. Teracolus, i. p. 12, pl. 3, figs. 1a to 1g (1889).  
*Colotis Phisadia*, Bingham, Fauna of Brit. India, Butt. ii. p. 264 (1907).  
*Pontia Arne*, Klug, Symb. Phys. pl. 7, figs. 1 to 4, ♂ ♀ (1829).  
*Idmais Arne*, Boisduval, Spéc. Gen. D. Lep. p. 587, pl. 19, fig. 2 (1836).  
*Teracolus Arne*, Butler, Ann. Mag. Nat. Hist. 1876, p. 487. Manders, Ent. Monthly Mag. 1890,  
 p. 16. Sharpe, Proc. Zool. Soc. 1896, p. 527.  
*Idmais Philamene*, Mabille, Comptes Rend. Soc. Ent. Belg. 1880, p. evi.

IMAGO.—Male. Upperside. *Forewing* salmon-pink, paler than in *Protractus*, basal area with black and blue-grey scales, costal band imperfect, narrow and with black and blue-grey scales, the salmon-pink portion consequently much more extensive, a large black, usually round spot at the end of the cell with a black streak running inwards from it, outer band much as in *Protractus*, but with a deeper curve on its upper margin below the apex and another below the middle. The spots larger, and of the ground colour of the wing, the lower one large and square. *Hindwing* as in *Protractus*, but the ground colour is pure white, with a few blue-grey scales at the base. Underside; both wings as in *Protractus*.

Female. Upperside. *Forewing* paler than in the male, the costal band broader, more perfect and blackish-brown, the outer band much as in the male, but browner and with some pale pinkish spots on the exterior margin. *Hindwing* as in the male, but the exterior band is more brown, and paler, and there are some pale pinkish spots on the exterior margin. Underside. Both wings pale yellowish, tinged with pink, darkest on the costa of the forewing and the outer borders of both wings, the spots on the forewing larger, the cell spot usually white-centred; a small spot white-centred at the end of the cell in the hindwing, and indications of a discal whorl of conjoined brown spots. The general colour in this sex is sometimes yellowish above, with the base of the forewing suffused with salmon-pink, sometimes without this suffusion, and sometimes both wings are white.

Expanse, ♂ ♀ 2 inches.

LARVA found feeding on *Salvadora Persica* at Aden; pea-green when young, two black spots on back of head, a white mark almost the shape of an ace of diamonds, but rather large on the second segment, when older the black spots on head disappear, and the white mark gets clearer and is outlined with black; there are two similar marks just beyond the centre of the back, the front being the smaller, and another similar mark on the eleventh segment. (Nurse, Butler's Memoir, Proc. Zool. Soc. 1896, p. 245.)

PUPA.—Pinkish-grey with the segments well marked, rests on its tail and is tied to the wood by a silk thread; well figured by Butler, Proc. Zool. Soc. 1896, plate 10, fig. 13.

HABITAT.—North-West India, Arabia and the opposite African Coast.

DISTRIBUTION.—A male of this form is in the Calcutta Museum labelled Surat. Madders is said to have obtained a single specimen at Multan in the Punjab and “one individual captured in a field near Lucknow” (Moore’s notes). We admit this species into the Indian Fauna with great hesitation; there are so many Albinos and partial Albinos in both sexes of the *Teracoli*, a semi-Albino form of *Protractus* might so easily be mistaken for *Phisadia*. We have not been able to examine any one of the above-mentioned specimens.

#### COLOTIS PUELLARIS.

Plate 599, figs. 3, ♂, 3a, ♀, 3b, ♂, 3c, ♀ (Wet-season Brood), 3d, ♂, 3e, ♀, 3f, ♂, 3g, ♀ (Dry-season Brood = *Ochreipennis* = *Rorus*).

*Teracolus Puellaris*, Butler, Proc. Zool. Soc. 1876, p. 136; id. 1881, p. 608; id. 1883, p. 152; id. Ann. Mag. Nat. Hist. 1880, p. 222; id. 1888, p. 200; id. 1897, p. 389. Swinhoe, Proc. Zool. Soc. 1884, pp. 438 and 509. Watson, Journ. Bo. Nat. Hist. Soc. 1894, p. 521. Guy Marshall, Proc. Zool. Soc. 1897, p. 10. Sharpe, Monog. Gen. *Teracolus*, i. p. 16, pl. 5, figs. 1, 1a to 1d (1898). Nurse, Journ. Bo. Nat. Hist. Soc. 1899, p. 513. Aitken and Comber, Journ. Bo. Nat. Hist. Soc. 1903, p. 51.

*Idmais Puellaris*, Swinhoe, Journ. Bo. Nat. Hist. Soc. 1887, p. 276.

*Teracolus Ochreipennis*, Butler, Proc. Zool. Soc. 1876, p. 136; id. 1881, p. 609; id. 1883, p. 152. Swinhoe, Proc. Zool. Soc. 1884, p. 509; id. Journ. Bo. Nat. Hist. Soc. 1887, p. 276.

*Teracolus Rorus*, Swinhoe, Proc. Zool. Soc. 1884, p. 438, pl. 39, fig. 8, ♂.

*Colotis Vestalis*, Bingham (part), Fauna of Brit. India, Butt. ii. p. 265 (1907).

Wet-season Brood (Figs. 3, ♂, 3a, ♀, 3b, ♂, 3c, ♀).

IMAGO. Inhabits desert and sandy tracts. Male. Upperside pure white. *Forewing* with the base irrorated with black and blue-grey scales, the cell blackly irrorated except for a small portion at its lower end, a large, generally round, black spot at the end, with a black inward streak, costal line between this and the outer band black with some blue-grey irrorations attached, outer black band much as in *Phisadia*, but narrower hindwards, the spots in it similarly placed, but pure white. *Hindwing* with very little grey irrorations at the base, the outer band as broad as in *Phisadia*, but its inner margin is more irregular; cilia of both wings white. Underside pale yellow, the outer marginal space of the forewing and the whole of the hindwing deeper yellow, the spots on the forewing as in *Phisadia*, as are also the unmarked hindwings.

Female. Upperside white, often slightly tinted with yellow. *Forewing* with the cell black, joined to, and often obscuring the large spot at its end, costal line pale, with some ochreous-grey irrorations, the base of the wing irrorated with black and blue-grey scales, the outer band as in the male, but always more or less paler. *Hindwing* with very little basal irrorations, the outer band variable in width, and paler than in the male. Underside. *Forewing* white, tinted with pale yellow, the spots as in the

male, but the lowest discal spot, though larger than the others, does not expand hindwards on to the lower margin as it always does in the male. *Hindwing* tinted with ochreous-pink, usually without markings, sometimes with indications of the discal whorl of spots. Cilia of both sexes white.

Antennæ, head, thorax and abdomen black, the antennæ speckled and tipped with white, the thorax clothed with long, bluish-grey hairs; on the underside the palpi, thorax and abdomen are white.

Expanse, ♂ ♀  $1\frac{6}{10}$  to  $1\frac{7}{10}$  inches.

Dry-season Brood (Figs. 3d, ♂, 3e, ♀, 3f, ♂, 3g, ♀).

Male and Female. Upperside much as in the other form. The basal irrorations paler and the bands somewhat narrower. Underside with the forewings similar, but the spots are sensibly smaller, and the hindwings of both sexes are strongly tinted with ochreous-pink.

Expanse, ♂ ♀  $1\frac{5}{10}$  to  $1\frac{6}{10}$  inches.

HABITAT.—North-West and Central India.

DISTRIBUTION.—We have it from the Hubb River, Sukkur, Larkana, Hyderabad and Karachi (Sind), also from Deesa in Rajputana; Bisnagar, Khandesh and Bhooj. Yerbury took it at Campbellpur and Chittar Pahar in the Punjab, and it is in the B. M. from Wurzeerabad.

#### COLOTIS VESTALIS.

Plate 600, figs. 1, ♂, 1a, ♀, 1b, ♂, 1c, ♀ (Wet-season Brood = *Dubius*), 1d, ♂, 1e, ♀ (Dry-season Brood).

*Teracolus Vestalis*, Butler, Proc. Zool. Soc. 1876, p. 135, pl. 7, fig. 10, ♂; id. 1881, p. 608; id. 1883, p. 152. Swinhoe, Proc. Zool. Soc. 1884, pp. 438 and 509. Watson (part), Journ. Bo. Nat. Hist. Soc. 1894, p. 520. Butler, Trans. Ent. Soc. 1895, p. 519; id. Ann. Mag. Nat. Hist. 1897, p. 390. Guy Marshall, Proc. Zool. Soc. 1897, p. 11. Sharpe, Monog. Gen. *Teracolus*, i. p. 18, pl. 6, figs. 1, 1a, 1b, 1c, and 1f (1898). Nurse, Journ. Bo. Nat. Hist. Soc. 1899, p. 513.

*Idmais Vestalis*, Swinhoe, Journ. Bo. Nat. Hist. Soc. 1887, p. 276.

*Teracolus Peelus*, Swinhoe, Proc. Zool. Soc. 1884, p. 439, pl. 39, fig. 9, ♂, and p. 509.

*Teracolus Dubius*, Swinhoe, l.c. pp. 439 and 509.

*Colotis Vestalis*, Bingham (part), Fauna of Brit. India, Butt. ii. p. 265 (1907).

Wet-season Brood (Figs. 1, ♂, 1a, ♀, 1b, ♂, 1c, ♀).

IMAGO.—Inhabits desert and sandy tracts. Male. Upperside pure white, wings somewhat more elongate than in *Puellaris*. *Forewing* usually with less basal irroration, the bands and spots similar. *Hindwing* with the marginal band a little narrower. Underside as in the male of *Puellaris*, but the lowest discal spot of the forewing is usually smaller than the one above it, and is always well separated from the lower margin, whereas in *Puellaris*, as in *Protractus* and *Phisadia*, it is the largest and always expands hindwards on to the lower margin.

Female. Upperside white and marked like the male, but the bands are of a paler tint and the basal irrorations are much more extensive. Underside. *Forewing* white tinted with yellow, the spots as in the male, the lowest discal spot almost always the smallest of the three, often minute and obscure, the borders tinted with pale flesh colour. *Hindwing* darker than the forewing, tinted with pale flesh colour, and with a discal whorl of brown conjoined spots, more or less complete.

Expanse, ♂ ♀  $1\frac{8}{10}$  to  $1\frac{9}{10}$  inches.

Dry-season Brood (Figs. 1d, ♂, 1e, ♀).

Male. Upperside white, the general markings as in the Wet-season form, but the bands on both wings are reduced to almost half the width, the basal irrorations are much less, the white spots in the outer band of the forewing are larger, and the costal space up to the end of the cell is whitish irrorated with ochreous scales, and from thence to the apical band is pure white, the outer band of the hindwing never reaches the anal angle. Underside as in the Wet-season form, but the spots small.

Female. Like the Wet-season form, but the bands on the upperside usually very pale and narrow, the spots obscure; similar also on the underside, the spots small, the lowest discal spot minute, the discal band of the hindwing obsolescent.

Expanse, ♂ ♀  $1\frac{7}{10}$  to  $1\frac{8}{10}$  inches.

In both forms there are occasional females, varying in colour from sulphur-yellow to pale yellow = *Peelus*.

HABITAT.—North-West India.

DISTRIBUTION.—In our collection from Karachi, Hyderabad, the Hubb River (Sind), Deesa (Rajputana). Nurse records it from Kutch, and Yerbury took it at Campbellpur (Punjab).

#### COLOTIS INTERMISSUS.

Plate 600, figs. 2, ♂, 2a, ♀, 2b, ♂, 2c, ♀ (Wet-season Brood), 2d, ♂, 2e, ♀, 2f, ♂, 2g, ♀ (Dry-season Brood).

*Teracolus Intermissus*, Butler, Proc. Zool. Soc. 1883, p. 152.

*Teracolus Ochreipennis*, Swinhoe (nec Butler), Proc. Zool. Soc. 1884, p. 438.

*Teracolus Vestalis*, Watson (part), Journ. Bo. Nat. Hist. Soc. 1894, p. 520. Sharpe, Monog. Gen.

*Teracolus*, i. p. 18, pl. 6, figs. 1d, 1e (1898).

*Colotis Vestalis*, Bingham (part), Fauna of Brit. India, Butt. ii. p. 265 (1907).

Wet-season Brood (Figs. 2, ♂, 2a, ♀, 2b, ♂, 2c, ♀).

IMAGO.—Inhabits desert and sandy districts. Male. Upperside white, the bands and markings as in the Dry-season form of *Vestalis*. Underside. *Forewing* tinted with yellow, the outer borders tinted with pinkish flesh colour. *Hindwing* in freshly emerged specimens dark pinkish flesh colour, the black band showing slightly through the wing, the entire wing covered with minute black atoms.

Female. Upperside as in the females of the Dry-season form of *Vestalis*. Underside similar as to markings, but the borders of the forewing and the whole of the hindwing suffused with dark pinkish flesh colour, with minute irrorations as in the male, the flesh colour of the undersurface in both sexes fades in life, but not after death, and never becomes yellow as in *Vestalis* if the examples are kept from the light; a discal whorl of conjoined brown spots.

Expanse, ♂ ♀  $1\frac{5}{16}$  inches.

Dry-season Brood (Figs. 2d, ♂, 2e, ♀, 2f, ♂, 2g, ♀).

Male. Upperside white, with all the bands very narrow, the white costal space on the forewing between the cell spot and the apical band much wider than in the Wet-season form, the white spots in the outer band larger, the marginal band of the hindwing sometimes very narrow and seldom extending hindwards beyond the extremity of vein 2. Underside as in the Wet-season form.

Female. Upperside white, often tinted with pale yellow, the bands as narrow as in the male, but much paler in colour, the basal half of the costa of forewing irrorated with ochreous scales. Underside like that of the Wet-season form, but the spots of the forewing are smaller, the lowest discal spot minute, and the hindwing has no markings.

Expanse, ♂ ♀  $1\frac{4}{16}$  inches.

HABITAT.—Karachi (Sind).

DISTRIBUTION.—We took this form at Karachi in November, December, January, February, and March, 1885–86. The type came from Karachi. We have never obtained it in any other locality. There can be no doubt there are two forms of it, whether we call them Wet and Dry-season forms or by any other term; we have a long series, and cannot but come to the conclusion that it should be kept distinct until we get some good evidence to the contrary.

#### Genus MADAIS, nov.

*Idmais*, Boisduval (part), Spéc. Gen. Lep. i. p. 584 (1836). Doubleday, Gen. Diurn. Lep. p. 59 (1847).

Schatz, Ex. Schmett. ii. p. 73 (1886). Kirby, in Allen's Nat. Hist. Lep. ii. p. 198 (1886).

Insects of a uniform salmon-buff colour, with a black outer marginal band, occupying the apical third of *Forewings* and always extending to the lower angle, containing spots of the ground colour; the band on the hindwings macular; males and females very similar, but many females liable to albinism; larger than *Colotis*, the costa of forewings concave, the apex sub-acuminate; males always with a prominent sex mark on the forewings, in the form of a patch of brown specialized scales or androconia on the underside above vein 1, closer to the base than to the exterior margin, prominent above as a raised spot, the hinder margin of forewing prominently lobed; all the species are desert forms.

Type, *M. Fausta*, Olive, from Arabia and India.

## MADAIS FAUSTA.

Plate 601, figs. 1, ♂, 1a, ♀, 1b, ♂ (Wet-season Brood), 1c, ♂, 1d, ♀ (Dry-season Brood), 1e, ♀ (Albino).

*Papilio Fausta*, Olivier, Voy. l'Emp. Oth. Atlas, pl. 33, figs. 4a, 4b, ♀ (1801).

*Pieris Fausta*, Godart, Enc. Méth. ix. p. 132 (1819).

*Idmais Fausta*, Boisduval, Spéc. Gen. Lep. i. p. 586 (1836). Boisduval, Gen. D. Lep. p. 59 (1847).

Moore, Cat. Lep. Mus. E.I.C. i. p. 68 (1857). Swinhoe, Journ. Bo. Nat. Hist. Soc. 1887, p. 40.

*Teracolus Fausta*, Butler, Proc. Zool. Soc. 1876, p. 134; id. Ann. Mag. Nat. Hist. 1882, p. 4.

Swinhoe, Proc. Zool. Soc. 1884, p. 436. Aitken, Journ. Bo. Nat. Hist. Soc. 1887, p. 40.

Watson (part), Journ. Bo. Nat. Hist. Soc. 1894, p. 517. Guy Marshall (part), Proc. Zool. Soc. 1897, p. 8. Butler, Ann. Mag. Nat. Hist. 1897, p. 498. Nurse, Journ. Bo. Nat. Hist. Soc. 1899, p. 513.

*Colotis Fausta*, Bingham (part), Fauna of Brit. India, Butt. ii. p. 266 (1907).

*Idmais Faustina*, Felder, Reise Novara, Lep. ii. p. 190 (1865).

*Teracolus Faustina*, Butler, Proc. Zool. Soc. 1876, p. 134.

*Teracolus Rosaceus*, Butler, l.c. p. 134, pl. 7, fig. 6, ♂.

*Teracolus Oriens*, Butler, l.c. fig. 7, ♀.

*Teracolus Solaris*, Butler, l.c. p. 135. Swinhoe, Proc. Zool. Soc. 1884, p. 437, pl. 39, fig. 5, ♀.

## Wet-season Brood (Figs. 1, ♂, 1a, ♀, 1b, ♂).

IMAGO.—Male. Upperside of a uniform ochreous-salmon colour. *Forewing* with the costal band blackish, caused by dense black irrations, a black oval spot at the end of the cell, a black outer band, formed by a bar that extends downwards from the costa at one-fifth from apex to vein 4, the black extended on the veins to the outer marginal band, leaving four spots of the ground colour, the upper one small, the marginal band is continued narrowly to the lower angle of the wing, and in some examples is joined to the bar from the costa, below the spots, but this extension is often very irregular and dislocated; this outer band is rather uniform in width, narrowing hindwards very gradually, and contains a row of marginal small spots of the ground colour, one in each interspace. *Hindwing* with a marginal row of black nearly square spots, one at the extremity of each vein, the costal space whitish. Underside pale ochreous tinged with a rosy flush, darkest towards the base; bands and spots pale orange-brown, a white-centred spot at the end of each cell, the sub-apical bar of the forewing followed by two or three spots in the disc and a complete discal band of conjoined spots.

Female. Upperside marked like the male, but paler, and there are many Albinoes; the basal irrations are more extensive, sometimes covering nearly half the wings, the cell spot of the forewing is larger, and also the spots on the hindwing, their inner margins touching each other, and there are indications of a discal blackish macular band. Underside paler, the black cell spot of forewing white-centred, the discal bands variable in size, in some of the white examples the spots are conjoined and very

prominent. Antennæ, head, thorax, and abdomen blackish, the two former with salmon-buff hairs, abdomen with similar coloured scaling, club of antennæ also salmon-buff on the underside.

Expanse, ♂ ♀ 2 inches.

Dry-season Brood (Figs. 1c, ♂, 1d, ♀).

Male. Upperside paler than in the Wet-season form. *Forewing* with the apical band small, the sub-apical bar and exterior marginal band being well separated and only joined together by some black lines on the veins, the thin marginal band has large spots of the ground colour in it, is much attenuated hindwards and seldom reaches the lower angle. *Hindwing* with the marginal spots small. Underside pale, the markings similar, but feeble.

Female. Similar to the male, rather paler in colour, the apical band more extensive, the sub-apical bar continued hindwards to vein 2, connected with the marginal band by black veins forming five or six spots of the ground colour, and a marginal row of well pronounced similarly coloured spots. Underside as in the male, the spots on the bands across the disc of both wings conjoined, those in the forewing sometimes marked with black.

Expanse, ♂ ♀  $1\frac{8}{10}$  to  $1\frac{9}{10}$  inches.

HABITAT.—North-West India, Asia Minor, Persia and Afghanistan.

DISTRIBUTION.—We took it at Karachi, Hydrabad (Sind), Quetta, Kandahar, Ahmedabad, Deesa, and Bisnuggar (Goozerat), and we have it from Fao in the Persian Gulf, Bushire and Bhooj. It is in the B. M. from Turkey, Syria, Lebanon, Rawul Pindi, Campbellpur, Chittar, Pakar and Kutch, and Butler reports it from Kattiawar and the Berars.

#### MADAIS FULVIA.

Plate 601, figs. 2, ♂, 2a, ♀, 2b, ♂ (Wet-season Brood), 2c, ♂, 2d, ♀, 2e, ♂ (Dry-season Brood = *Palliseri*).

*Idmais Fulvia*, Wallace, Trans. Ent. Soc. 1867, p. 392, pl. 9, fig. 5, ♂ ♀.

*Teracolus Fulvia*, Butler, Proc. Zool. Soc. 1876, p. 135. Swinhoe, Proc. Zool. Soc. 1885, p. 143.

*Idmais Tripuncta*, Butler, Proc. Zool. Soc. 1868, p. 221, pl. 17, fig. 9, ♂. Moore, Lep. Ceylon, i. p. 130, pl. 49, figs. 3, 3a, ♂ ♀. Butler, Ann. Mag. Nat. Hist. 1897, p. 500.

*Colotis Tripuncta*, Bingham, Fauna of Brit. India, Butt. ii. p. 267 (1907).

*Teracolus Tripunctatus*, Butler, Proc. Zool. Soc. 1880, p. 149, pl. 15, fig. 4, ♀. Watson, Journ. Bo. Nat. Hist. Soc. 1894, p. 518.

*Idmais Surya*, Moore, Journ. As. Soc. Bengal, 1884, p. 45.

*Teracolus Palliseri*, Butler, Ann. Mag. Nat. Hist. 1888, p. 418.

Wet-season Brood (Figs. 2, ♂, 2a, ♀, 2b, ♂).

IMAGO.—Male. Upperside ochreous-salmon colour, darker than in *Fausta*. *Forewing* with an iron-grey costal band of scales, a large black nearly oval spot at the

end of the cell, a rather broad apical black band gradually narrowing hindward to the lower angle, with three large spots of the ground colour in it in a row, sometimes there is a minute spot above and another below this row, and some pale dots on the margin, some grey scales at the base. *Hindwing* with a band of largish square spots on the exterior margin, at the ends of the veins. Underside pale ochreous, the forewing tinged with salmon colour, a large black oval white-centred spot at the end of the cell of the forewing, a red-brown, white-centred cell spot on hindwing, and a discal band of red-brown spots across both wings.

Female above and below marked like the male, the spots a little larger, the ground colour nearly always white, every example in the B. M. collection is pure white, and in most examples there are indications of a discal band of black spots on the hindwings above; on the underside the edges of the wings are tinged with pink, the spots large and dark, nearly black on the forewing.

Expanse, ♂ ♀ 2 inches.

Dry-season Brood (Figs. 2c, ♂, 2d, ♀, 2e, ♂).

Male. Upperside paler than in the other form. *Forewing*, with the irrorations of the costa and at the base very feeble, the cell spot smaller, the apical band paler in colour and not continued to the lower angle. *Hindwing* with the exterior band hardly indicated, there being merely three or four faint marks on it. Underside very pale, the markings the same, but very feeble and of a pinkish-ochreous colour.

Female. Often white like the Wet-season form, sometimes tinged with salmon colour, always paler than the male. Upperside, the markings darker than in the male, the hindwing generally with well-marked black marginal spots. Underside, the markings are similarly placed, but the discal bands are broad, well pronounced and of a pinkish-brown colour.

Expanse, ♂ ♀  $1\frac{8}{10}$  to  $1\frac{9}{10}$  inches.

HABITAT.—Ceylon, Southern India.

DISTRIBUTION.—We took it on the small hills above Poona, and at Purundhur Mountain near Poona, we have it also from Madras and the Nilgiris, it is in the B. M. from Ceylon, Ganjam and Khandesh. Moore records it from Orissa.

ALLIED ARABIAN SPECIES.

*Teracolus Protomedia*, Pontia Protomedia, Klug, Symb. Phys. Ins. pl. 8, figs. 13, 14 (1829).

*Teracolus Arenicolens*, Butler, Ent. Mo. Mag. 1884, p. 81.

*Teracolus Pleione*, Pontia Pleione, Klug, l.c. figs. 7, 8 (1829), *Teracolus Pleione*, Swinhoe, Proc. Zool.

Soc. 1884, p. 436. Guy Marshall, Proc. Zool. Soc. 1897, p. 14. *Synonym*, Idmais Miriam,

Felder, Reise Nov. p. 190, pl. 27, figs. 3 and 4 (1865). *Teracolus Chrysomela*, Butler, Cist.

Ent. 1874, p. 244. Idmais Echeria, Mabille, Bull. Soc. Ent. France, 1879, p. 174.

*Teracolus Eris*, Pontia Eris, Klug, l.c. pl. 6, figs. 15, 16 (1829). *Synonym*, Idnais Fatma, Felder, Reise Nov. p. 189, pl. 25, fig. 3 (1865).

*Teracolus Halimedea*, Pontia Halimedea, Klug, l.c. pl. 7, figs. 12 to 15 (1829). Guy Marshall, Proc. Zool. Soc. 1897, p. 15. *Synonym*, Pontia Acaste, Klug, l.c. figs. 16, 17, ♀ (1829). Pieris Polycaste, Boisduval, Spéc. Gen. Lep. i. p. 525 (1836). *Teracolus Coelestis*, Swinhoe, Proc. Zool. Soc. 1884, p. 435, pl. 39, figs. 1, 2.

*Callosune Yerburii*, *Teracolus Yerburii*, Swinhoe, Proc. Zool. Soc. 1884, p. 441, pl. 39, fig. 12. Guy Marshall, Proc. Zool. Soc. 1897, p. 33. *Synonym*, *Teracolus Swinhoei*, Butler, Proc. Zool. Soc. 1884, p. 491.

*Callosune Nouna*, Anthocharis Nouna, Lucas, Expl. Alg. Zool. iii. p. 350, pl. 1, fig. 2 (1849). Butler, Proc. Zool. Soc. 1884, p. 491.

*Callosune Saxeus*, *Teracolus Saxeus*, Swinhoe, Proc. Zool. Soc. 1884, p. 441, pl. 40, figs. 1, 2. Butler, Proc. Zool. Soc. 1884, p. 491.

*Callosune Epigone*, Anthopsyche Epigone, Felder, Reise Nov. ii. p. 186 (1865). Butler, Proc. Zool. Soc. 1884, p. 490.

*Callosune Miles*, *Teracolus Miles*, Butler, Ann. Mag. Nat. Hist. 1883, p. 105.

*Madais Vi*, *Teracolus Vi*, Swinhoe, Proc. Zool. Soc. 1884, p. 437, pl. 39, figs. 6, 7. Butler, Proc. Zool. Soc. 1884, p. 488.

#### Genus EURYMIUS.

*Eurymus*, Swainson, Horsfield's Cat. Lep. E.I.C. pp. 129 to 134 (1829); id. Zool. Ill. ii. pl. 60 (1831). Scudder, Butt. U. States, ii. p. 1096 (1889). Kirby, Allen's N. L. Butt. ii. p. 208 (1896).

*Colias*, Fabricius (part), Illiger's Mag. Ins. vi. p. 284 (1807). Latreille, Enc. Méth. ix. pp. 10, 89 (1819). Boisduval, Spéc. Gen. Lep. i. p. 634 (1836). Doubleday, Gen. D. Lep. p. 72 (1847). Butler, Cist. Ent. i. pp. 35, 43 (1870). Schatz, Sch. Exot. ii. p. 68 (1866). Bingham, Fauna of Brit. India, Butt. ii. p. 232 (1907).

*Eriocolias*, Watson, Entom. 1895, p. 167.

Type, *Hyale*, Linnæus (European).

*Antennæ* short, with a large but gradually-formed club. *Palpi* long, compressed, scaly, and somewhat bristly, the terminal joint short. *Tarsi* without appendages. *Wings* rather short and broad; the *Hindwings* rounded, the *Forewing* with the cell rather short and broad, the *Hindwing* with the cell rather long and narrow. *Forewing* with the apex slightly rounded off, the sub-costal nervure four-branched, the first branch emitted before end of cell, the second at or beyond the end, the third and fourth forming a small fork at the tip of the wing; the upper radial is thrown off from the sub-costal considerably beyond the cell; middle discocellular short, straight, lower one long, slightly curved, oblique and somewhat angulated.

The "clouded yellow" form a very distinct group, and are very numerous in species, especially in Central Asia. The males are generally of a yellow colour, varying from light sulphur-yellow to deep orange, the latter being sometimes flushed with purple, so deep in one or two instances as to appear almost black; some species are of a dull green. Some of the females are coloured like the males, many are Albinoes, and

often the same species have many examples of both females, many females also exhibit Albino patches.

The *Larvæ* are green, smooth, pubescent, and feed on *Leguminosæ*. The *Pupa* is pointed in front.

Watson's *Eriocolias* is intended to include the *Hyale* group, in which the border is often streaked, but never spotted in the male; the principal character is that the males have, on the upperside of the hindwings, between the costal and sub-costal nervures, a patch of modified scales of a smaller size, and much more numerous than the surrounding scales, usually of the same ground colour; in the old genus *Colias* (our *Eurymus*) Watson proposes to retain the orange species in which these scales are wanting (*E. Chrysotheme*, Esper, etc.) and the sub-group represented by *E. Phiconome*, Esper, improperly indicated as the type, as it is not even one of the species mentioned in Illiger's Mag.; pending a critical examination of the numerous species of this genus, which might probably reveal other characters of greater importance, we content ourselves by calling attention to Watson's genus, without adopting at present a sub-division which would separate species so much resembling each other as *C. Hyale* and *C. Chrysotheme*, solely on a secondary sexual character, however well marked or constant.

#### EURYMUΣ ERATE.

Plate 602, figs. 1, ♂, 1a, ♀, 1b, ♂ (Wet-season Brood), 1c, ♀ (Albino), 1d, ♂, 1e, ♀ (Dry-season Brood).

*Papilio Erate*, Esper, Ausl. Schmett. i. (2), pl. 119, fig. 3 (1806).

*Colias Erate*, Butler, Proc. Zool. Soc. 1880, p. 409; id. 1881, p. 607; id. 1886, p. 370. Elwes, Trans. Ent. Soc. 1884, p. 23. Butler, Ann. Mag. Nat. Hist. 1882, p. 3. Moore, Proc. Zool. Soc. 1882, p. 255. Swinhoe, Trans. Ent. Soc. 1885, p. 344. Butler, Ann. Mag. Nat. Hist. 1888, p. 196. Mackinnon and de Nicéville, Journ. Bo. Nat. Hist. Soc. 1898, p. 588. Leslie and Evans, Journ. Bo. Nat. Hist. Soc. 1903, p. 675.

*Colias Neriene*, Fischer, Ent. Ross. ii. Lep. p. 251, pl. 11, figs. 3, 4 (1823).

*Colias Hyale*, Butler (nec Linnaeus), Proc. Zool. Soc. 1870, p. 727, and 1874, p. 273. Moore, 2nd Yarkand Miss. p. 4 (1879). Doherty, Journ. As. Soc. Bengal, 1886, p. 136. Bingham (part), Fauna of Brit. India, Butt. ii. p. 234 (1907).

*Colias lativitta*, Moore, Proc. Zool. Soc. 1882, p. 255.

Wet-season Brood (Figs. 1, ♂, 1a, ♀, 1b, ♂).

IMAGO.—Male. Upperside lemon-yellow. *Forewing* with a small space at the base irrorated with dark-grey scales, costal line to the outer band also with grey scales, its base usually with a short orange streak, an oval black spot at the end of the cell, a deep black immaculate band on the exterior border, commencing on the costa one-third from the apex, its inner margin oblique outwardly to vein 4, then runs down to the

lower margin, is sinuous and has one or two curves in it; in some examples there are two or three obscure pale sub-apical streaks within the band, but usually it is without markings. *Hindwing* with some grey irrorations on the basal half, a large round orange spot at the end of the cell, and a black immaculate band on the exterior border, moderately broad in its middle, sinuous in its inner margin, narrowing rapidly both upwards and hindwards, never reaching the anal angle; costal space whitish, cilia of both wings white with orange tips. Underside much darker yellow, the hindwing darker than the forewing. *Forewing* with a large black white-centred oval spot at the end of the cell, a discal row of five brown spots running evenly with the margin, two small brown spots on the costa above them. *Hindwing* with slight greenish-grey irrorations on the inner portion, a large round, white shining spot with a small one close above it, at the end of the cell, both encircled with two red-brown rings, between which the colour is pale red-brown, a brown mark in the middle of the costa and a discal row of red-brown dots, one in each interspace, running evenly with the outer margin, cilia of both wings orange-red. Antennæ, head and front of thorax in both sexes salmon-pink, the rest of the thorax and abdomen greenish-black, with some white hairs on the former, beneath they are pale yellow, legs pinkish.

Female. Upperside coloured as in the male, but always paler. *Forewing* with the exterior black band similar in shape, but usually broader, and always with five or six largish spots of various sizes in the middle of the band, four or five sub-apical, the two lowest the largest, a large one a little below the middle and a small one close below it. *Hindwing* with the orange cell spot larger, the outer band composed of large black spots in the interspaces, joined together and widened at the apex with a yellow spot in it and continued up to the beginning of the costal pale space. Underside as in the male.

Expanse, ♂ ♀  $2\frac{1}{10}$  to  $2\frac{2}{10}$  inches.

Dry-season Brood (Figs. 1d, ♂, 1e, ♀).

Male and female paler than in the Wet-season form, some of the females almost whitish, the markings similarly disposed, but the bands very narrow in both sexes, and some of the spots on the exterior border of the female above are often obsolescent; in the outer border of the forewing of the male above there are frequently several pale diffuse streaks.

Expanse, ♂ ♀,  $1\frac{8}{10}$  to  $1\frac{9}{10}$  inches.

HABITAT.—Afghanistan, Beloochistan and the Himalayas.

DISTRIBUTION.—We took it in great numbers in Kandahar and Quetta, and it is in our collection from Cashmire, Kulu Murree and Campbellpur (Yerbury); Doherty reports it from Kunawur and Naini Tal, Moore from Yarkand, Mackinnon and de Nicéville from Mussuri, and Leslie and Evans from Chitral; Moore's type of *Lativitta* came

from Nepal ; the species has a long range, extending throughout the Palearctic Regions of Asia ; Esper's type came from South Russia.

NOTE.—Both forms (*Erate* and *Glicia*) have Albino females ; I took white females in cop. with both kinds of males ; different in flight and habits to *Fieldii*, twice as fast in flight and hardly ever settling (Lang's notes).

### EURYMUS GLICIA.

Plate 602, figs. 2, ♂, 2a, ♀ (Wet-season Brood), 2b, ♂, 2c, ♀, 2d, ♂ (Dry-season Brood).

*Colias Hyale Glicia*, Fruhstorfer (ined.) in Seitz Gross Schmett. ii., Fauna, Indo-Australica, pl. 9, figs. ♂ ♀ (1909).

*Colias Sareptensis*, Butler (nec Staudinger), Proc. Zool. Soc. 1880, p. 409 ; id. Ann. Mag. Nat. Hist. 1882, p. 3. Swinhoe, Trans. Ent. Soc. 1885, p. 344. Butler, Proc. Zool. Soc. 1886, p. 371 ; id. Ann. Mag. Nat. Hist. 1888, p. 197.

*Colias Hyale*, Leslie and Evans (nec Linnaeus), Journ. Bo. Nat. Hist. Soc. 1903, p. 675. Bingham (part), Fauna of Brit. India, Butt. ii. p. 234 (1907).

Wet-season Brood (Figs. 2, ♂, 2a, ♀).

IMAGO. Male. Upperside pale lemon-yellow, always paler than *Erate*, some of the males very pale. *Forewing* marked like the female of *Erate*, the apical portion of the pale spots within the exterior black band generally joined together. *Hindwing* with the orange cell spot smaller and paler, sometimes obsolescent, the band on the exterior border macular, the spots smaller and the band seldom thickened at its upper end, sometimes the lower spots are quite small. Underside as in *Erate*, but the spots are smaller and the colour of the wings paler.

Female. Upperside pale primrose to pure white, both wings marked as in the male. Underside also as in the male.

Expanse, ♂ ♀ 2 inches.

Dry-season Brood (Figs. 2b, ♂, 2c, ♀, 2d, ♀).

Male. Upperside as in the Wet-season form, but the outer black band of the forewing is seldom brought down to the lower angle, and the outer band of the hindwing is very faintly indicated, often represented by a few grey marks. Underside as in the Wet-season form.

Female. Like the female of the Wet-season form, but the spots on the outer band of the forewing are smaller and often fewer in number, the outer band of the hindwing with smaller spots ; on the underside the hindwing is greenish, being covered with minute green-grey scales.

Expanse, ♂ ♀  $1\frac{4}{5}$  to  $1\frac{8}{5}$  inches.

HABITAT.—Afghanistan, Beloochistan and the Himalayas.

DISTRIBUTION.—We caught it flying with *Erate* in the same localities and quite as numerous, and it appears to extend throughout the same regions. There are many more Albino females than in *Erate*; the types came from Cashmir; we have it from many localities in North-Western India.

#### EURYMUS CHRYSODONA.

Plate 603, figs. 2, ♂, 2a, ♀, 2c, ♀ (Wet-season Brood), 2b, ♂, 2d, ♀ (Dry-season Brood).

*Colias Neriene*, var. *Chrysodona*, Boisduval, Gen. Ind. Mith. p. 7 (1840).

*Colias Hyale*, var. *Chrysodona*, Elwes, Trans. Ent. Soc. 1884, p. 23.

*Colias Erate* ab. *Chrysodona*, Verity, Rhop. Palearctica, p. 219, pl. 40, figs. 27, 28 (1909).

*Colias Neriene*, Wallace (nec Fischer), Trans. Ent. Soc. 1867, p. 391.

*Colias Helichta*, Lederer, Verh. Zool.-bot. Ges. Wien, ii. p. 33 (1853). Butler, Proc. Zool. Soc. 1880, p. 408. Swinhoe, Trans. Ent. Soc. 1885, p. 343.

*Colias Hyale*, Bingham (part), Fauna of Brit. India, Butt. ii. p. 234 (1907).

Wet-season Brood (Figs. 2, ♂, 2a, ♀, 2c, ♀).

IMAGO. Male. Upperside deep orange-yellow. *Forewing* with a small patch of blackish irrorations at the base, costal line orange, a large nearly round black spot at the end of the cell, and a broad black outer marginal band, occupying one-fourth of the wing, broadest at the apex, its inner edge oblique towards the outer margin, then almost even in width to the lower margin, its inner edge as usual irregular; cilia white and pink. *Hindwing* with the basal two-thirds lightly irrorated with blackish-grey scales, a large orange spot at the end of the cell; costal space pale, an apical short black band not reaching the anal angle, its inner edge irregular. Underside pale chrome-yellow. *Forewing* with a round black, white-centred cell spot, and a discal row of black spots, decreasing in size upwards, and two brown costal spots on their inner side. *Hindwing* with green irrorations, a brown sub-apical, costal spot, a large round white cell spot with a small one above it, both ringed with orange-brown, and a discal row of brown dots; cilia whitish.

Female. Upperside varying in colour, from deep orange-yellow to pale chrome-yellow. *Forewing* with the cell spot larger, and the marginal band broader than in the male, containing five or six pale spots, usually paler than the ground colour, four from the costa, a large one below the middle and very often a small one beneath; a few grey irrorations at the base of the wing. *Hindwing* with a band of faintly indicated, very large spots on the exterior border, outwardly, and at the apex heavily, marked with black, the inner side of the spots faintly marked by a thin blackish band; the interior portion of the wing irrorated with pale-grey scales; a large orange spot at the end of the cell; cilia as in the male. Underside in all respects as in the male.

Expanse, ♂ ♀  $2\frac{1}{10}$  to  $2\frac{2}{10}$  inches.

## Dry-season Brood (Figs. 2b, ♂, 2d, ♀).

Male and female differ only in their smaller size, paler colouring, and narrower bands.

Antennæ, frons and thorax in front orange-pink, rest of thorax and abdomen above greenish-grey, below pale yellow like the wings and legs.

Expanse, ♂ ♀  $1\frac{9}{10}$  to  $2\frac{1}{10}$  inches.

HABITAT.—Afghanistan, Beloochistan and Chitral; extends into Russia.

DISTRIBUTION.—We took both forms in Kandahar and Quetta, where it was not common, there are two dry-season forms in the B. M. from Chitral and two from Fergana, and some Wet-season forms from Sarepta in South Russia, and Hissar Mountains, Turkistan.

## EURYMUS NILAGIRIENSIS.

Plate 603, figs. 1, ♂, 1a, ♀, 1c, ♀ (Wet-season Brood), 1b, ♂ (Dry-season Brood).

*Colias Nilagiriensis*, Felder, Wien, Ent. Mon. iii. p. 395 (1859). Wallace, Trans. Ent. Soc. 1867, p. 391. Hampson, Journ. As. Soc. Bengal, 1888, p. 362. Fergusson, Journ. Bo. Nat. Hist. Soc. 1891, p. 444.

*Colias Nilgiriensis*, Butler, Proc. Zool. Soc. 1881, p. 607. Bingham, Fauna of Brit. India, Butt. ii. p. 234, pl. 18, fig. 121 (1907).

*Colias Hyale*, var. *Nilgherriensis*, Elwes, Trans. Ent. Soc. 1884, p. 23.

*Colias Hyale*, var. *Nilgiriensis*, Verity, Rhop. Palearctica, p. 225, pl. 40, figs. 40, 41 (1909).

## Wet-season Brood (Figs. 1, ♂, 1a, ♀, 1c, ♀).

IMAGO.—Male. Upperside lemon-yellow. *Forewing* with the basal third and costal space thickly irrorated with black scales, a large black oval spot at the end of the cell, exterior black border broad, occupying one-third of the wing, its inner margin sinuous, and here and there running a little inwards on the veins; five or six spots of the ground colour across its middle, four sub-apical and one below its middle, the spots fairly uniform in size, the lowest generally the largest, the band deepest at the apex, its inner margin more or less curved, and it narrows gradually hindward on to the lower margin. *Hindwing* with black irrorations spreading all over the wing, except for a large round space at the end of the cell, which is of the ground colour with an orange-yellow centre, the irrorations dark at the base and gradually paling outwards, the black exterior marginal band fairly broad at the apex, narrowing gradually upwards and hindwards, its inner margin suffused and traversed by spots of the ground colour; cilia of both wings white marked with pinkish-orange. Underside much paler yellow. *Forewing* with the costal line dark orange-red, with two darker spots near the apex, a large black cell spot and an almost straight discal line of black spots. *Hindwing*, irrorated with greenish scales, an orange-red spot on the costa a little beyond the

middle, a white round spot at the end of the cell, with a small one above it, both ringed with orange-red, a discal whorl of orange-red dots; cilia of both wings orange-red; the costal line of the hindwing of the same colour.

Female. Upperside white; fore and hindwings marked as in the male. Underside markings also similar, but the white ground colour of the wings gives them a brighter appearance.

Expanse, ♂ ♀  $1\frac{8}{10}$  inches.

Dry-season Brood (Fig. 1b, ♂).

Male and female only differ from the Wet-season form in being smaller and paler with the bands narrower, the yellow spots above large, and all the spots below more or less faintly indicated.

Expanse, ♂ ♀  $1\frac{5}{10}$  to  $1\frac{6}{10}$  inches.

HABITAT.—Madras Hills.

DISTRIBUTION.—In our collection from the Nilgiri Hills, both forms; in the B. M. from the Pulni Hills; Wallace records it from Malabar, and Fergusson from Travancore.

EURYMUS SHIPKEE.

Plate 603, figs. 3, ♂, 3a, ♀.

*Colias Shipkee*, Moore, Proc. Zool. Soc. 1865, p. 492, pl. 31, fig. 13.

*Colias Ladakensis*, Felder, Reise Novara, Lep. ii. p. 197, pl. 27, figs. 8, 9, ♂ (1865). Wallace, Trans. Ent. Soc. 1867, p. 391. Moore, Proc. Zool. Soc. 1882, p. 254. Elwes, Trans. Ent. Soc. 1884, p. 24. Mackinnon and de Nicéville, Journ. Bo. Nat. Hist. Soc. 1898, p. 589. Bingham, Fauna of Brit. India, Butt. ii. p. 236 (1907). Verity, Rhop. Palearctica, p. 229, pl. 41, figs. 30, 32 (1909).

IMAGO.—Male. *Forewing* rich primrose-yellow, in some individuals having an orange tint on the disc of *forewing*; exterior margin broadly black, the inner margin of the band curved and sinuous and not sharply defined, the band broadest at the apex, a series of large yellow, more or less spear-shaped, spots within the band, a black spot closing the cell, in some examples this spot is annular, enclosing a yellow centre; cilia rosy. *Hindwing* primrose-yellow, more or less suffused in different individuals with dusky irrorations; a band of acute oval large yellow spots on the exterior margin, their edges more or less defined with black; cell closed by a very faintly defined orange spot; cilia rosy. Underside. *Forewing* paler yellow, the black margin of the upperside faintly visible, and of a greenish-grey colour, and having also indistinctly the series of yellow spots; the veins and the costal margin also greenish-grey, a black spot closing the cell as above. *Hindwing* dull dark greenish-grey; exterior margin showing the form of the spots of the upperside; a rufous spot with silvery centre at

the end of cell; antennæ and legs rosy; palpi greenish-yellow; head with frontal tuft; thorax and abdomen greenish-grey; forepart of thorax rosy.

Female. Very similar to the male. Upperside with the ground colour richer. *Forewing* with the black band on the exterior margin broader. *Hindwing* with the dusky irrorations more dense. Underside much as in the male.

Expanse, ♂ 2 inches.

HABITAT.—Thibet; Cashmir.

DISTRIBUTION.—In the B. M. from Ladak, Koka, Lahul, Cashmir, and many examples from Eastern Thibet. Flies with rapidity over the pastures on the mountain slopes above the Sutlej, near Shipkee, at an altitude of thirteen thousand to fifteen thousand feet, frequenting the meadow-land, rich in grasses and flowers, just below the melting snow-beds in June (Lang), also taken at Ladakh and Cashmir.

NOTE.—Moore's *Colias Shipkee* was published in October, 1865, Felder's description as well as his Plate 27 were not published till some time after that date; the dates on Felder's plates are the dates on which the proofs were completed, and seldom represent the date of publication. Dr. A. G. Butler has commented on this in Ann. Mag. Nat. Hist. 1870, p. 2.

#### EURYMUS ALPHERAKII.

Plate 604, figs. 5, ♂, 5a, ♀.

*Colias Alpherakii*, Staudinger, Berl. Ent. Zeit. 1882, p. 164. Elwes, Trans. Ent. Soc. 1884, p. 23.

Grum-Grshimailo, Rom. Mem. iv. p. 337, pl. 3, figs. 2a, 2b, 2c, ♂ ♀ (1890). Bingham, Fauna of Brit. India, Butt. ii. p. 239 (1907). Verity, Rhop. Palearctica, p. 226, pl. 41, figs. 15, 16 (1909).

*Colias Alpherakii*, var. *Roschana*, Grum-Grshimailo, Hor. Soc. Ent. Ross. 1893, p. 381. Verity, Rhop. Palearctica, p. 227, pl. 41, figs. 18, 19 (1909).

IMAGO.—Male. Upperside pale sulphur-yellow, nearly white. *Forewing* with the base, costal space and veins irrorated with black scales, a large, nearly oval black spot closing the cell, a broad black band, occupying the outer third of the wing, broadest at the apex, its inner margin recurved and irregular, a complete series of spear-shaped large spots of the ground colour through the middle of the band, one in each interspace, the first and third from the lower angle the smallest. *Hindwing* with some basal black irrorations, a large pale spot at the end of the cell, an apical black band, rather broad, almost filled with four large spear-shaped spots of the ground colour and not extending further hindwards. Underside whiter. *Forewing* with a large black spot at the end of the cell, costal line orange, the veins prominent, the outer band space limited by a discal row of black spots, the lowest large, decreasing in size upwards and becoming obsolescent. *Hindwing* with a marginal band of faintly indicated large spear-shaped spots, on a pale ground, the remainder of the wing densely irrorated with greenish-grey scales, a large round white spot at the end of the cell.

Female. Upperside whiter than the male. *Forewing* with no black irrations, except a small patch at the base, the cell spot larger, and exterior black band broader, with the spots in it larger than in the male. *Hindwing* as in the male, but paler, an irregular blackish band with dark veins on the exterior margin. Underside as in the male. Antennæ, head and body pale sulphur-yellow, club of antennæ brownish-pink.

Expanse, ♂ ♀ 2 to  $2\frac{2}{10}$  inches.

HABITAT.—Chitral.

#### EURYMUS ELWESI.

*Colias Nastes*, var. *Leechi*, Elwes, Journ. Bo. Nat. Hist. Soc. 1898, p. 466, ♂ ♀ (nom. preocc.).

*Colias Leechi*, Bingham, Fauna of Brit. India, Butt. ii. p. 238 (1907).

*Colias Elwesi*, Röber, Seitz, Gross Schmett. i. p. 63 (1907).

*Colias Cocandica*, var. *Elwesi*, Verity, Rhop. Palearctica, p. 233, pl. 42, fig. 24 (1909).

IMAGO.—Male. Upperside white slightly tinged with primrose. *Forewing* with a small patch of blackish irrations on the lower half of the base, and some irrations on the costal line, a black oval spot at the end of the cell, a blackish recurved discal band, curving inwards to the costa and outwards to the lower margin, joined on the veins to large spear-shaped spots on the exterior margin. *Hindwing* irrorated with blackish scales, except the cell and the outer marginal border, the latter pale space limited by a sinuous and somewhat zigzag blackish thin band, which becomes obsolescent hindwards, the irrations darkest near the base and abdominal spaces. Underside white. *Forewing* with the cell spot small, exterior markings showing through the wing, limited by a row of blackish spots. *Hindwing* with the outer pale space limited by a whorl of brownish spots, the inner portion of the wing rather densely irrorated, the costal space and the entire cell free of irrations and white.

Female. Very similar to the male both above and below, the discal bands slightly broader.

Antennæ and head pale pinkish-brown, palpi and body above and below dusky greenish-white.

Expanse, ♂ ♀  $1\frac{1}{2}$  inches.

HABITAT.—Native Sikkim.

DISTRIBUTION.—In the B. M. from Chonging Valley and Kardong Pass.

#### EURYMUS PHILA.

• *Colias Phicomone Phila*, Frühstorfer, Iris, 1903, p. 47.

One male from Kashmir, differs from about twenty males from the Alps, on account of the greater range and the brownish-red, instead of black, spot at the end of the cell of the forewing. The golden discal spot (or stain) of the hindwing is larger, the golden sub-marginal bands unusually broad, on the other hand all the black bands are much reduced.

Underside of the hindwing much darker green than in any European examples, although the tip of the apex of the forewing is brighter. Length of forewing 35 mm. =  $1\frac{3}{8}$  inches. Kashmir, 17,000 to 19,000 feet. August, 1902.

*Phicomone* has up to now only been seen in the Alps, Pyrenees and Hungary, on this account the locality Kashmir is very interesting.

We have not seen this form; the above is Fruhstorfer's description; the block is from a figure he has kindly sent me.

Elwes, in Iris, 1903, throws doubts on a form of *Phicomone* being found so far east as Kashmir, and suggests it may be a form of *Cocandica*, but the figure certainly much more nearly represents *Phicomone*, and it has no resemblance to Elwes' *C. Leechi* which has been renamed *Elwesi* by Röber, the name *Leechi* being preoccupied in this genus.



Phila.

#### EURYMUS EOGENE.

Plate 605, figs. 2, ♂, 2a, ♀, 2b, ♀, 2c, ♀ (dimorphic form).

*Colias Eogene*, Felder, Reise Nov. Lep. ii. p. 196, pl. 17, fig. 7, ♂ (1865). Wallace, Trans. Ent. Soc. 1867, p. 390. Erschoff, Lep. Turkistan. ii. (v.) p. 6 (1874). Elwes, Trans. Ent. Soc. 1880, p. 136; id. 1884, p. 13. Alphéraky, Stett. Ent. Zeit. 1883, p. 493. Grum-Grshimailo, Rom. Mem. Lep. iv. p. 329, pl. 5, figs. 1a, 1b, 1c, ♂ ♀ (1890). Elwes, Journ. Bo. Nat. Hist. Soc. 1898, p. 465. de Nicéville, Report Pamir Boundary Com. Nat. Hist. Results, p. 16 (1898); id. Journ. Bo. Nat. Hist. Soc. 1902, p. 249, pl. FF, fig. 12, ♀. Leslie and Evans, Journ. Bo. Nat. Hist. Soc. 1903, p. 675. Bingham, Fauna of Brit. India, Butt. ii. p. 241 (1907). Verity, Rhop. Palearctica, p. 243, pl. 43, figs. 1 to 3, and pl. 44, fig. 1 (1909).

*Colias Myrmidone*, var. *Eogene*, Keferstein, Verh. Zool. bot. Ges. Wien, 1883, p. 452.

IMAGO.—Male. Rich orange-vermilion, veins prominent. *Forewing* with a patch of blue-grey scales on the lower base, some ochreous irrorations on the costa, a black, nearly linear spot closing the cell, a broad glazed black outer marginal band, nearly uniform in width from costa to lower margin, occupying more than a fourth of the wing, its inner edge irregular but almost evenly curved; cilia crimson. *Hindwing* with more than the abdominal third covered with blue-grey scales, the outer border broad in its middle, narrowing upwards and hindwards and usually not reaching the anal angle; cilia crimson and white. Underside. *Forewing* with its inner portion pale crimson, the costal and outer spaces greyish-green, the latter limited by a row of blackish spots, a brown, white-centred spot at the end of the cell. *Hindwing* greyish-green, a pinkish patch at the end of the cell, containing a small round white spot, a discal row of more or less obscure brown spots. Cilia of both wings crimson.

Female. Dimorphic, in some examples coloured like the male, in others it is blue-grey. Upperside. *Forewing* with the veins always well marked, the cell spot large and pale-centred, the marginal band much broader than in the male, containing a row of pale spots, varying in number, the basal third of the wing irrorated with blue-grey

scales. Hindwing dusky black with blue-grey irrorations on the abdominal third, a large crimson patch at the end of the cell with an exterior tooth, three or four pale discal spots, often absent. Cilia of both wings crimson. Underside as in the male, but in the orange-vermilion form the interior portion of the forewing is suffused with bright crimson.

Palpi above, antennae and collar crimson, body above greyish-black; below it is coloured like the wings; legs crimson.

Expanse, ♂ ♀ 1½ to 2 inches.

HABITAT.—N.W. Himalayas.

DISTRIBUTION.—Sikkim, Kashmir, Ladak, Chitral, Thibet in B. M., and de Nicéville reports it from the Great Pamir and from the Little Pamir.

#### EURYMUS STOLICZKANA.

Plate 605, figs. 3, ♂, 3a, ♀, 3b, ♀ (dimorphic form).

*Colias Stoliczkanæ*, Moore, Ann. Mag. Nat. Hist. 1878, p. 229; id. Sci. Res. Yarkand Mission, p. 4, pl. 1, fig. 1 (1879). Elwes, Journ. Bo. Nat. Hist. Soc. 1898, p. 465. Bingham, Fauna of Brit. India, Butt. ii. p. 242 (1907).

*Colias Eogene*, var. *Stoliczkanæ*, Alphéraky, Rom. Mem. Lep. v. p. 74, pl. 4, figs. 4a, 4b, 4c, ♂ ♀. Verity, Rhop. Palaearctica, p. 247, pl. 43, figs. 22 to 24, and pl. 44, fig. 2 (1909).

IMAGO.—Male. Upperside of a uniform orange-ochreous colour. *Forewing* with a small patch of blackish scales at the base, some ochreous-white scales on the costa near the base, a brown, almost linear spot with a pale centre at the end of the cell, and a broad dull black marginal band as in *Leechi*. *Hindwing* with the abdominal third irrorated with blackish scales, and a marginal band as in *Leechi*. Cilia of both wings pinkish-white. Underside also similar.

Female. Upperside generally white, in some specimens the interior of both wings is more or less tinged with bright ochreous-orange. *Forewing* with the veins blackish, the cell spot black, the outer marginal band about the depth of that in the male, a complete row of spear-shaped, large whitish spots across its middle, one in each interspace, decreasing in size upwards, the row bending in on to the costa, the lower spots connected by whitish lines to the exterior margin. *Hindwing*. Upperside more or less densely irrorated with black scales, a large round orange spot at the end of the cell, a row of large spots on the outer border, each connected with the margin as in the forewing, the upper part of the band very black. Cilia of both wings whitish. Underside as in the male.

Expanse, ♂ ♀ 2 inches.

HABITAT.—N.W. Himalayas.

DISTRIBUTION.—The type came from Ladak, recorded from Kashmir and Sikkim above 15,000 feet; in the B. M. from Chong Ching Valley and Kardong Pass.

## EURYMUS MIRANDA.

Plate 604, figs. 4, ♂, 4a, ♀.

*Colias Eogene Miranda*, Fruhstorfer, Insectenbörse, Vom. 7 Mai, 1903; id. Iris, 1903, p. 48, pl. 1, figs. 3, 4, ♂ ♀. Verity, Rhop. Palearctica, p. 247, pl. 43, figs. 26, 27 (1909).  
*Colias Stoliczkana*, Bingham (part), Fauna of Brit. India, Butt. ii. p. 242 (1907).

A splendid local form of *Colias Eogene*, Felder; the most important characteristic is that in *Miranda* the black outer border diminishes in the middle, whilst in *Eogene* it continues equally broad right up to the anal edge. The underside of the wings is a darker green and the black spot on the apex of the cell of the forewing as well as the brownish-red spot of the hindwing are much larger and more acute; on account of this larger spot *Miranda* resembles *Stoliczkana*, from which it differs, however, through the dark gold (instead of faded chrome-gold) ground colour, and through the brilliant unusually broad rose-colour extending to the cilia. *Stoliczkana* is moreover described from Ladak in North Kashmir, a place many hundred miles from Sikkim.

The female of *Miranda* is quite different from the male, and, on account of its clear beautiful colour contrast, is quite the most handsome of any of the known species up to present. The forewings are orange-coloured up to the black sub-marginal border; the outer border is (especially apically) very broad black, with a row of golden spots; on the costal edge, two pretty gold spots stand sub-apically; the hindwings (with the exception of the anal edge) are quite black, with a clear, long, orange-coloured discal spot; on the black outer edge are some beautiful golden spots, which anally become broader and in some examples meet together; the underside of the forewing is orange-coloured towards the base, and becomes by degrees golden towards the apex; the costal edge is dark green, the sub-costal and radial veins are light blue-green; the hindwings are, above the marginal edge, rich dark green; the sub-marginal zone, however, has between the veins some dark citron-gold markings; all the veins are clearly and broadly marked with bluish-green.

Expanse, ♂  $1\frac{7}{10}$  to ♀  $1\frac{9}{10}$  inches.

HABITAT.—Sikkim, 17,000 to 19,000 feet (Fruhstorfer). We have not seen this form, but it seems to be quite distinct; the description and figures are copies of those of the Author.

## EURYMUS DUBIA.

Plate 604, figs. 6, ♂, 6a, ♀.

*Colias Dubia*, Elwes, Proc. Zool. Soc. 1906, p. 481, pl. 36, figs. 8, 9, ♂ ♀. Bingham, Fauna of Brit. India, Butt. ii. p. 239 (1907).  
*Colias Eogene*, var. *Dubia*, Verity, Rhop. Palearctica, p. 247, pl. 50, figs. 23, 24 (1909).

IMAGO.—Male. Upperside dull orange-ochreous. Forewing with the veins blackish, costa with yellow scales, a dark dense patch of black scales on the lower

portion of the base, a narrow black spot across the end of the cell, outer marginal border broadly blackish, nearly even in width, crossed by very thin white lines, one in each interspace, in one example these lines thicken inwardly. *Hindwing* with the abdominal portion thickly irrorated with blackish scales, a broad band along costa and exterior border, its inner margin obscure and marked with a series of large whitish spots. Underside. *Forewing* bright orange-yellow, the costal and outer parts greenish, the outer portion limited by a row of black spear-shaped spots in the interspaces, decreasing in size upwards where they curve inwards on to the costa, a black spot at the end of the cell. *Hindwing* with the ground colour pale primrose-yellow, covered with green irrorations, a discal row of brown spots limiting the outer and paler portion, the inner part of the wing densely irrorated, a white spot on an orange-red small space at the end of the cell with a small pale smear on its inner side.

Female. Upperside. *Forewing* duller in colour, the veins more heavily marked, the cell spot larger, the marginal band much broader, with a middle row of spear-shaped, whitish spots. *Hindwing* entirely covered with pale blackish scales, a large orange spot at the end of the cell, a discal whorl of large whitish spots. Underside as in the male, but duller in colour. Antennæ and head in front pink, club brown, thorax and abdomen blackish, the latter with white lines beneath.

Expanse, ♂ ♀  $1\frac{4}{10}$  inches.

HABITAT.—Sikkim; Thibet.

DISTRIBUTION.—In the B. M. from Khamba Jong, 15,000 to 16,000 feet, and Shanak Valley.

#### EURYMUS LEECHI.

Plate 604, figs. 3, ♂, 3a, ♀.

*Cylias Eogene*, var. *Leechi*, Grum-Grshimailo, Horæ, Soc. Ent. Ross. 1893, p. 382. Fawcett, Proc. Zool. Soc. 1904, vol. ii, p. 140, pl. 9, figs. 10, ♂, 10a, ♀. Verity, Rhop. Palearctica, p. 248 (1909).

IMAGO.—Male. Upperside dark dull ochreous-orange colour. *Forewing* with a small patch of blue-black scales on the lower part of the base, costal margin greyish-white, a black spot closing end of cell, often linear, a broad dull black exterior marginal band, very slightly broadest at the apex, its inner edge uneven, but almost uniformly rounded, in some examples running somewhat in on the lower margin of the wing, all the veins prominent. Cilia white and crimson. *Hindwing* also with the veins prominent, the blue-black irrorations occupying the abdominal third of the wing, sometimes the abdominal half, an apical dull black band, narrowing upwards on to and along the costa, and hindwards to vein 2, sometimes a little lower, a very large pale orange-vermilion round spot at the end of the cell. Cilia white and crimson. Underside. *Forewing* inwardly suffused with pinkish-orange, the costal and exterior marginal spaces broadly greyish-green, a white-centred black spot at the end of the

cell, a row of blackish dots in the disc, limiting the outer marginal space, often more or less obsolescent, and two blackish-brown sub-apical dots on the costa. *Hindwing* entirely covered with greyish-green irrorations, a large vermilion patch at the end of the cell with two outwardly extended teeth, its inner portion containing a round white spot, a discal row of small red-brown spots.

Female. Upperside. *Forewing* paler and brighter than the male, the basal irrorations more extensive, the cell spot and outer band about the same size, but the latter contains a row of pale spots, the middle one the smallest. *Hindwing* covered with grey irrorations, a large vermilion patch at the end of the cell, sometimes with one, sometimes with two external teeth, a costal and outer marginal blackish band, broader than in the male, but its interior margin is very diffuse and obscure and contains a row of large pale spots; cilia of both wings as in the male. Underside as in the male. Palpi above, antennæ, and collar crimson, body above greenish-grey, below it is concolorous with the wings; legs crimson.

Expanse, ♂ 2  $\frac{7}{10}$  to 2 inches.

HABITAT.—N.E. Himalayas.

DISTRIBUTION.—Kardong Pass, Chong Ching Valley, and Native Sikkim in the B. M.

#### EURYMUS BERYLLA.

Plate 604, figs. 1, ♂, 1a, ♀, 2, ♀ (var. *Nina*).

*Colias Berylla*, Fawcett, Proc. Zool. Soc. 1904, vol. ii. p. 139, pl. 9, fig. 8, ♀. Elwes, Proc. Zool. Soc. 1906, p. 480, pl. 36, fig. 13, ♂. Bingham, Fauna of Brit. India, Butt. ii. p. 237 (1907).

*Colias Nina*, Fawcett, l.c. p. 140, fig. 9, ♀.

*Colias Erschoffi*, var. *Berylla*, Verity, Rhop. Palearctica, p. 253, pl. 50, figs. 25, 26 (1909).

IMAGO.—Male. Upperside rich bright sulphur-yellow. *Forewing* with the base thickly irrorated with black atoms, costal margin slightly irrorated, a black oval spot at end of cell, outer marginal black band broad, its inner edge irregular and somewhat sinuous, a row of more or less elongate spots of the ground colour down its centre, each being connected with the margin by a pale, slender line, the spots in the middle more or less obsolete. *Hindwing* irrorated with greenish-black, except for a broad pale band of the ground colour, its inner edge with a succession of blackish curves in the interspaces, which thicken upwards into a black sub-apical patch, outer edge with a very obscure sub-terminal band, which darkens upwards and is deep black at the apex; a large yellow spot at the end of the cell centred with orange; cilia yellow, of the hindwing posteriorly it is pink. Underside. *Forewing* yellow, the costal and outer margins green, discocellular spot and three post-discal spots black, the latter decreasing in size upwards. *Hindwing* green, a small round silvery white spot at the end of the cell, the broad yellow band of the upperside represented by a sub-marginal row of large obscure yellowish spots.

Female. Upperside. *Forewing* orange-yellow, base and upper portions irrorated with dusky black scales, markings similar to the male. *Hindwing* as in the male, but the basal and medial areas darker, almost black, the broad outer marginal band much irrorated with blackish scales. Underside as in the male, but paler. Antennæ of both sexes bright red-pink; head, thorax and abdomen blackish above.

Expanse, ♂ ♀  $2\frac{6}{10}$  to  $2\frac{9}{10}$  inches.

HABITAT.—Khamba Jong, Gyantse, Tibet. Elwes says the females vary much as is usual in the genus, and *Nina* is an extreme form; both of Fawcett's types are females, and Elwes says he has received a long series from the same locality.

#### EURYMUS WISKOTTI.

Plate 605, figs. 1, ♂, 1a, ♀.

*Colias Wiskotti*, Staudinger, Berl. Ent. Zeit. 1882, p. 166, pl. 2, figs. 9, 10, ♂ ♀. Grum-Grshimailo,

Rom. Mem. iv. p. 347 (1890). Bingham, Fauna of Brit. India, Butt. ii. p. 240 (1907). Verity, Rhop. Palearctica, p. 260, pl. 46, figs. 1 to 3 (1909).

*Colias Wiskotti*, ab. *Leuca*, Staudinger, l.c. p. 167, ♀.

*Colias Wiskotti*, var. *Separata*, Grum-Grshimailo, Hor. Eat. Ross. xxii. p. 305 (1888); id. Rom. Mem. iv. p. 349, pl. 4, figs. 3, a, b (1890).

*Colias Wiskotti*, var. *Seres*, Grum-Grshimailo, l.c. p. 353, ♀.

*Colias Wiskotti*, ab. *Leucotheme*, Grum-Grshimailo, l.c. p. 351, ♀.

*Colias Wiskotti*, var. *Sagina*, Auctant. Natur. 1891, p. 99. Staudinger, Iris, 1891, p. 232.

IMAGO.—Male. Upperside pale orange-yellow. *Forewing* suffused more or less with orange, some blackish-green irrorations on the lower base, a large black spot at the end of the cell, and a very deep dull black marginal border, occupying more than a third of the wing, of a fairly uniform breadth, its inner edge scalloped above the middle and bent inward on to the costa, its lower edge angled and then runs inwards on the lower margin to its middle. *Hindwing* irrorated with blackish-green scales, a large orange, round spot at the end of the cell and a deep black marginal border, which generally stops abruptly on vein 2; the veins through the border whitish, and often this is the case also on the forewing. Underside dull whitish-yellow, very uniform in colour on both wings. *Forewing* with a black cell spot. *Hindwing* very sparsely irrorated with greenish scales, a whitish spot at the upper end of the cell. Cilia of both wings white.

Female. Upperside bright ochreous-orange. *Forewing* with the cell spot and outer band as in the male, but the band has generally three or four pale spots. *Hindwing* covered with greenish-grey irrorations, an orange cell spot, and the band about as broad as in the male, but suffused hindwards, where it has some pale streaks. Cilia orange and white. Underside as in the male, but some examples have the inner portion of the forewing suffused more or less with orange, and there are three or four lower discal black spots.

The various varieties described only differ from the type form in the tint of colour, some of the females being almost pure white. Antennæ, palpi, head and fore part of the thorax orange.

Expanse, ♂ ♀  $2\frac{4}{10}$  inches.

HABITAT.—Chitral, extending upwards into Turkistan.

### EURYMUS FIELDI.

Plate 605, figs. 4, ♂, 4a, ♀, 4b, ♀ (Wet-season Brood), 4c, ♂, 4d, ♀ (Dry-season Brood), 4e, ♀ (Extreme Dry-season Brood).

*Colias Fieldi*, Ménétriés, Cat. Mus. Petr. Lep. i. p. 79, pl. 1, fig. 5 (1855). Wallace, Trans. Ent. Soc. 1867, p. 390. Butler, Proc. Zool. Soc. 1870, p. 126; id. 1874, p. 273. Elwes, Trans. Ent. Soc. 1880, p. 136; id. 1884, p. 7. Moore, Proc. Zool. Soc. 1882, p. 254. Doherty, Journ. As. Soc. Bengal, 1886, p. 126. Butler, Ann. Mag. Nat. Hist. 1888, p. 196. Manders, Trans. Ent. Soc. 1890, p. 534. Swinhoe, Trans. Ent. Soc. 1893, p. 308. Mackinnon and de Nicéville, Journ. Bo. Nat. Hist. Soc. 1898, p. 588. Leslie and Evans, Journ. Bo. Nat. Hist. Soc. 1903, p. 675. Bingham, Fauna of Brit. India, Butt. ii. p. 243 (1907). Verity, Rhop. Palearctica, p. 266, pl. 46, figs. 26, 27 (1909).

*Colias Edusa*, var. *Myrmidone*, Moore (nec Esper), Proc. Zool. Soc. 1865, p. 492. Elwes, Trans. Ent. Soc. 1884, p. 7.

*Colias Edusina*, Butler (nec Felder), Proc. Zool. Soc. 1886, p. 370; id. Ann. Mag. Nat. Hist. 1888, p. 196. Watson, Journ. Bo. Nat. Hist. Soc. 1897, p. 669.

#### Wet-season Brood (Figs. 4, ♂, 4a, ♀, 4b, ♀).

IMAGO.—Male. Upperside deep cadmium orange-yellow. *Forewing* with a small space of the lower base thickly irrorated with greenish-black scales, and a few scales of the same colour on the costa, a large pear-shaped black spot closing the end of the cell, a broad black exterior marginal border with a sinuous inner margin, slightly running in on the lower margin, and curved below the apex where the band is a little broader. *Hindwing* covered with a thin coating of greenish-black scales, except at the end of the cell, where there is a large, nearly round, space of the ground colour, and except near the inner margin of the outer black border, where there are some spots of the ground colour, decreasing in size upwards, the abdominal marginal third very thickly covered with some long soft hairs at base, the actual abdominal marginal space whitish, tinged with greenish-blue, the marginal black band of medium size, thin near the anal angle, which it does not reach, sinuous on its inner margin, thickening at the middle, narrowing at the apex and running along the costa to the base, broadening basally and with a large white patch close to the base. Underside. *Forewing* paler than it is above, of a bright ochreous-orange tinge, the costal and exterior marginal spaces tinged with green, costal line dark orange, two or three small brown spots on it near the apex, three black lower discal spots on the inner edge of the outer band, increasing in size hindwards, and a large deep black, nearly round, spot centred with white at the end of the cell.

*Hindwing* covered with greenish irrorations, a large white spot at the end of the cell, with a small one above it, both ringed with brownish-orange, and some suffusion of the same colour close around them; costal line brownish-orange, a brown spot in its middle, and a whorl of discal brownish-orange dots. Cilia of both wings above and below orange.

Female. Upperside. *Forewing* paler in colour, the base more thickly irrorated, the irrorations often extending to nearly the middle of the wing, the cell spot larger, the costal margin also irrorated, the exterior band much broader, its inner margin usually curving into the wing below the costa and at veins 3 and 2; five or six pale whitish spots in the middle of the band, four, sometimes five, in a whorl downwards from the costa, increasing in size hindwards, a larger spot just below the middle with a small spot below it, sometimes absent. *Hindwing* much more thickly irrorated than in the male, the cell patch similar, no spots of the ground colour in the disc, the exterior band very broad, suffused inwardly, especially so hindwards, four or five large pale spots in it near its inner margin, decreasing in size hindwards, the band is extended broadly on the costa, having a large pale space at the base. Underside as in the male. Antennæ, head and thorax in front salmon-pink. Club of antennæ brownish, rest of thorax and abdomen above greenish-black, below yellow, a patch of thickly-set light yellow scales at the base of interspace 7 on the hindwing above.

Expanse, ♂ ♀  $2\frac{1}{10}$  to  $2\frac{6}{10}$  inches.

#### Dry-season Brood (Figs. 4c, ♂, 4d, ♀).

Male and female differ from the Wet-season form in their medium size, the outer bands on both wings above are narrower, and usually have the veins towards the apex of the forewing, whitish in the male, the general colour is paler and the irrorations lighter, on the underside both forms are alike.

Expanse, ♂ ♀ 2 to  $2\frac{2}{10}$  inches.

#### Extreme Dry-season Brood (Fig. 4e, ♀).

Male and female small in size, the colour pale, the exterior bands very narrow, the spots below small.

Expanse, ♂ ♀  $1\frac{8}{10}$  to 2 inches.

HABITAT.—The Himalayas, extending to Assam, Upper Burma, and the Shan States.

DISTRIBUTION.—We have received it from Campbellpur, Murree, Akhor, Abbottabad, and Thundian (Punjab), also from Mussuri, Sikkim, Mian Jani, and the Khasia Hills; Leslie and Evans record it from Chitral; Doherty from Kumaun, and Manders from the Shan States; it is in the B. M. from Goorais Valley, Scind Valley, Lahoul, Pangi, Simla, Nepal, Tibet, Bhutan, Chumbi, Naga Hills, Shan States, and from Upper Burma.

## INDO-CHINESE, TIBETAN AND JAPANESE ALLIED FORMS.

*Eurymus Aias*, Colias Palæno Aias, Fruhstorfer, Iris, 1903, p. 47. Verity, Rhop. Palearctica, p. 217, pl. 40, figs. 17, 18 (1909). Habitat, Japan.

*Eurymus Marcopolo*, Colias Marcopolo, Grum-Grshimailo, Hor. Ent. Ross. xxii. p. 304 (1888); id. Rom. Mem. iv. p. 318, pl. 11, figs. 1 to 3 (1890). Verity, Rhop. Palearctica, p. 214, pl. 40, figs. 1 to 3 (1909).

*Eurymus Poliographus*, Colias Poliographus, Motschulsky, Et. Ent. ix. p. 29 (1860). Leech, Butt. China, p. 431, pl. 34, figs. 1 to 14 (1894). *Synonym*, Colias Pallens, Butler, Journ. Linn. Soc. Zool. 1866, p. 52; id. Lep. Exot. p. 89, pl. 34, fig. 3 (1872). Colias Simoda, de l'Orza, Lep. Japan, p. 16 (1869). Colias Elwesi, Butler, Ann. Mag. Nat. Hist. 1881, p. 135. Colias subaurata, Butler, l.c. p. 138. Habitat, China, Japan.

*Eurymus Sieversi*, Colias Sieversi, Grum-Grshimailo, Rom. Mem. iii. p. 397 (1887); id. iv. p. 324, pl. 3, figs. 3, a to d (1890). Verity, Rhop. Palearctica, p. 225, pl. 41, figs. 13, 14, and pl. 51, fig. 1 (1909). Habitat, N.E. Tibet.

*Eurymus Sifanica*, Colias Sifanica, Grum-Grshimailo, Hor. Ent. Ross. xxv. p. 447 (1891). Verity, Rhop. Palearctica, p. 228, pl. 41, figs. 23 to 25 (1909). Habitat, N.E. Tibet.

*Eurymus Nebulosa*, Colias Nebulosa, Oberthür, Et. Ent. xix. p. 8, pl. 8, fig. 65 (1894). Habitat, Central China.

*Eurymus Montium*, Colias Montium, Oberthür, Et. Ent. xi. p. 16, pl. 6, fig. 41, ♂ (1886). Leech, Butt. China, ii. p. 436, pl. 34, fig. 15, ♀ (1893). Habitat, W. China.

*Eurymus Cocandica*, Colias Cocandica, Erschoff, Fedtsch. 1874, p. 6, pl. 1, fig. 3, ♀. Verity, Rhop. Palearctica, p. 231, pl. 41, figs. 2, 3, and pl. 42, figs. 10 to 13 (1909). Habitat, Pamirs, Thian-Chan.

*Eurymus Maja*, Colias Maja, Grum-Grshimailo, Hor. Ent. Ross. xxv. p. 447 (1891). Verity, Rhop. Palearctica, p. 233, pl. 41, fig. 4, and pl. 42, figs. 14, 15 (1909). Habitat, Thian-Chan.

*Eurymus Grumi*, Colias Grumi, Alphéraki, Rom. Mem. ix. p. 233 (1897). Verity, Rhop. Palearctica, p. 234, pl. 41, fig. 5, and pl. 42, figs. 17, 18 (1909). Habitat, Nan-Chan.

*Eurymus Tamerlana*, Colias Tamerlana, Staudinger, Iris, x. p. 152, pl. 5, figs. 1 to 3 (1897). Habitat, N.E. Tibet.

*Eurymus Lada*, Colias Lada, Grum-Grshimailo, Hor. Ent. Ross. xxv. p. 447 (1891). Verity, Rhop. Palearctica, p. 240, pl. 43, figs. 34, 35, and pl. 44, fig. 3 (1909). Habitat, N.E. Tibet.

*Eurymus Staudingeri*, Colias Staudingeri, Alphéraki, Hor. Ent. Ross. xvi. p. 368, pl. 14, figs. 3, 4 (1881). Habitat, Thian-Chan.

*Eurymus Felderi*, Colias Felderi, Grum-Grshimailo, Hor. Ent. Ross. xxv. p. 448 (1891). Verity, Rhop. Palearctica, p. 243, pl. 44, figs. 31, 32, and pl. 45, fig. 11 (1909). Habitat, N.E. Tibet, Amdo.

*Eurymus Arida*, Colias Eogene, var. Arida, Alphéraki, Rom. Mem. v. p. 76 (1889). Verity, Rhop. Palearctica, p. 245, pl. 41, figs. 9 to 13 and pl. 43, figs. 12 to 21 (1909). Habitat, N.E. Tibet, Nan-Chan.

*Eurymus Erschoffi*, Colias Erschoffi, Alphéraki, Hor. Ent. Ross. xvi. p. 362, pl. 14, figs. 1, 2 (1881). Verity, Rhop. Palearctica, p. 253, pl. 41, fig. 18, and pl. 45, figs. 16, 18 (1909). N.E. Tibet, Amdo.

*Eurymus Chinensis*, Colias Fieldi, var. Chinensis, Verity, Rhop. Palearctica, p. 266, pl. 46, figs. 22 to 25 (1909). Habitat, Central China, Tibet, Nan-Chan.

## Sub-Family ERONIINÆ.

## Genus PARERONIA.

*Eronia*, Hübner (part), Samml. Exot. Schmett. (1816). Doubleday, Gen. Diurn. Lep. 1847, p. 64.  
 Wallace, Trans. Ent. Soc. 1867, p. 387.  
*Valeria*, Horsfield, Cat. Lep. E.I.C. p. 139 (1829). (Inadmiss., being name of the Fabrician species.)  
*Nepheronia*, Butler, Cist. Ent. 1870, p. 38.  
*Pareronia*, Bingham, Fauna of Brit. India, Butt. ii. p. 276 (1907).

*Forewing*. Costa strongly arched, apex blunt, lower margin slightly rounded near the base, slightly concave beyond its middle, exterior margin nearly straight, costal vein extending two-thirds, first and second sub-costal branches emitted close together, at one-fourth before end of cell, discocellulars oblique, veins 6 and 7 from upper end of cell, upper discocellular therefore absent, middle strongly concave, lower nearly straight, cell more than half the length of the wing, veins 8 and 9 stalked, thrown off from 7 from beyond its middle.

*Hindwing* with the costa and apex slightly rounded, the exterior margin evenly curved, the anal angle obtuse, cell long, nearly extending to two-thirds of the wing, pre-costal nervure short and curved upwards, costal vein much curved towards its end, discocellulars sub-equal and very oblique. Thorax hairy, abdomen long, palpi short, thickly clothed with scales, hairy beneath, legs long and slender, antennæ long, with a lengthened club.

Type, *Valeria*, Fabricius, from Java.

## PARERONIA AVATAR.

Plate 606, figs. 1, ♂, 1a, ♀, 1b, ♂, 1c, ♀ (Wet-season Brood), 1d, ♂, 1e, ♀ (Dry-season Brood).  
*Eronia Avatar*, Moore, Cat. Lep. E.I.C. i. p. 61, pl. 2a, fig. 1, ♂ (1857). Wallace, Trans. Ent. Soc. 1867, p. 387. de Nicéville, Journ. As. Soc. Bengal, 1881, p. 59. Elwes, Trans. Ent. Soc. 1888, p. 419. Swinhoe, Trans. Ent. Soc. 1893, p. 311.  
*Nepheronia Avatar*, de Nicéville, Journ. As. Soc. Bengal, 1882, p. 64. Fruhstorfer, Iris, 1903, p. 101.  
*Pareronia Avatar*, Bingham, Fauna of Brit. India, Butt. ii. p. 277 (1907).  
*Nepheronia Avatar Terina*, Fruhstorfer, l.c.

Wet-season Brood (Figs. 1♂, 1a♀, 1b♂, 1c♀).

IMAGO.—Male. Upperside whitish, faintly tinted with blue. *Forewing*. Veins, costal band and outer marginal band black, the median vein prominently black, the band very broad at the apex, narrowing gradually to the lower angle, its inner side with long teeth running in on the veins. *Hindwing* also with black veins and a narrow black outer marginal band, its inner edge with angles on the veins. Cilia

whitish. Underside much paler and more white, of a uniform clear colour, with the veins of both wings black, the median vein of the forewing prominently black.

Female. Upperside coloured like the male, but the black sparsely spread irrorations in the clear interspaces give it a duller appearance, all the veins with black bands. *Forewing* with the costal band and outer marginal band black, the latter with a sub-marginal row of pale spots, connected more or less with the narrow pale streaks in the interspaces, these streaks narrowing upwards, two pale blackish streaks inside the cell, and one rather indistinct along the middle of the internomedian interspace. *Hindwing* with the outer third black, some pale sub-marginal spots which become obsolete hindwards, the upper four more or less connected with the pale streaks on the interspaces. Underside as in the male, but the veins are more broadly blackish. Antennæ, head, thorax and abdomen of both sexes dusky-brownish black.

Expanse, ♂ ♀  $3\frac{1}{2}$  inches.

Dry-season Brood (Figs. 1d, ♂, 1e, ♀).

Male. Coloured like the other form, only the median vein of the forewing black, the costal and outer marginal bands much narrower. *Hindwing* with the outer marginal band reduced to a black line, connecting small angular black marks on the vein ends. Underside veins less pronounced.

Female. Upperside with all the interspaces of both wings more broadly bluish-white, the black vein bands being much narrower, and the outer marginal bands very narrow. Underside with the veins paler.

Expanse, ♂ ♀  $2\frac{5}{10}$  to  $2\frac{6}{10}$  inches.

HABITAT.—Sikkim, Assam, Bhutan and Burma.

DISTRIBUTION.—We have received it from the Khasia Hills, Buxar in Bhutan, Tongou and Sikkim; it is in the B. M. also from Burma and Tenasserim; some of the Tenasserim examples are somewhat darker than usual, but are otherwise not separable from the typical form.

#### PARERONIA HIPPIA.

Plate 607, figs. 1, ♂, 1a, ♀, 1b, ♂, 1c, ♀ (Wet-season Brood), 1d, ♂, 1e, ♀ (Dry-season Brood = *Gaea*), 1f, ♀ (yellow hindwing variety), 1g, ♀ (Extreme Dry-season Brood), 1h (Larva), 1i (Pupa).

*Papilio Hippia*, Fabricius, Mant. Ins. ii. p. 55 (1787). Donovan, Ins. Ind. pl. 25, fig. 1, ♀ (1800). Godart, Enc. Méth. ix. p. 193 (1819).

*Eronia Hippia*, Wallace, Trans. Ent. Soc. 1867, p. 388. Elwes, Trans. Ent. Soc. 1888, p. 419. Manders, Trans. Ent. Soc. 1890, p. 535.

*Nepheronia Hippia*, Swinhoe, Proc. Zool. Soc. 1885, p. 139. Davidson, Bell and Aitken, Journ. Bo. Nat. Hist. Soc. 1897, p. 573. Watson, id. 1897, p. 670. Mackinnon and de Nicéville, id. 1898, p. 591. de Rhé-Philipe, id. 1902, p. 492. Fruhstorfer, Iris, 1902, p. 299.

*Pareronia Hippia*, Bingham, Fauna of Brit. India, Butt. ii. p. 278 (1907).

*Eronia Gaea*, Felder, Reise Nov. Lep. ii. p. 190 (1865).

*Nepheronia Gaea*, de Nicéville, Journ. As. Soc. Bengal, 1885, p. 51. Swinhoe, Proc. Zool. Soc. 1885, p. 139. Elwes and de Nicéville, Journ. As. Soc. Bengal, 1886, p. 431. Aitken, Journ. Bo. Nat. Hist. Soc. 1887, p. 41. Murray, id. 1888, p. 26. Hampson, Journ. As. Soc. Bengal, 1888, p. 363. de Nicéville, Journ. Bo. Nat. Hist. Soc. 1890, p. 387. Watson, id. 1891, p. 53. Fergusson, id. 1891, p. 445. Aitken and Comber, id. 1903, p. 51.

*Eronia Valeria*, Betham (nec Cramer), Journ. Bo. Nat. Hist. Soc. 1892, p. 422.

*Nepheronia Hippia*, ab. *Livilla*, Fruhstorfer, Iris, 1902, p. 300.

*Nepheronia Hippia*, ab. *Philomela*, Fruhstorfer, l.c.

Wet-season Brood (Figs. 1, ♂, 1a, ♀, 1b, ♂, 1c, ♀).

IMAGO.—Male. Upperside pale blue of a deeper tint than in *Avatar*; all the veins with black bands. *Forewing* with the costa broadly black, and a rather broad black band on the exterior margin, almost uniform in width, two or three sub-apical blue spots within the band and two or three below them sub-marginal, the blue stripe in the internomedian interspace with an excavation at its extremity, some of the others with minute excavations. *Hindwing* with a slightly broader black band on the exterior border, with similar excavations at the ends of the blue interspaces, the costal and abdominal spaces white. Underside much paler, the veins and outer marginal bands pale blackish, an indistinct row of large pale spots within the band on both wings.

Female. Upperside black, the markings white tinted with pale blue. *Forewing*. Cell with two streaks, the upper from base to about a third from the end, the lower from about the middle to the end; but the length of these streaks is sometimes variable, the two extending almost to the end of the cell in some examples; below and outside the cell are a series of streaks in the interspaces, in the internomedian interspace the streak is long and is split in two, and has two small sub-marginal spots near its end, the streaks shorten in length upwards, in the third interspace it consists of two elongated spots, there is also a row of more or less round sub-marginal spots, one near end of each streak, the spot at the end of the broken streak is absent. *Hindwing* with the cell and interspaces below and beyond it with broad streaks, the streak in the cell fairly filling it and split in two except at its base, the two hindmost streaks the longest, the others varying in length according to the length of the interspaces, the third and fourth being the shortest, at their ends are sub-marginal spots in an even row, the two lowest ones small, costal and abdominal spaces whitish. Underside dull whitish with the blue tint very slight, the markings all dull pale blackish, those on the forewing disposed like they are on the upperside, but the pale part of the hindwing is more extensive, the veins being thinly marked. Antennæ black; head, thorax and abdomen blackish-brown, the latter with long bluish hairs.

Expanse, ♂ ♀  $3\frac{2}{15}$  to  $3\frac{8}{15}$  inches.

Dry-season Brood (Figs. 1d, ♂, 1e, ♀ = *Gaea*).

Male. Upperside paler than the Wet-season form, the black on the veins and the outer marginal bands much narrower, the sub-apical blue spots in the band much larger and more numerous. Underside coloured as in the other form, but paler, the veins thinner on the hindwing, with the exception of the sub-costal nervure, they are usually unmarked.

Female. Differs from the other form in a similar manner, the colouring being paler and the streaks broader and the sub-marginal spots much larger.

Expanse, ♂ ♀  $2\frac{5}{10}$  to  $3\frac{1}{10}$  inches.

## Extreme Dry-season Brood (Fig. 1g, ♀).

A small pale form, differing from the above in both sexes in its size and the paleness and thinness of its markings.

Expanse, ♂ ♀  $2\frac{2}{10}$  to  $2\frac{3}{10}$  inches.

**LARVA.**—Davidson, Bell and Aitken say that the larvæ feed on the same plant as those of *Pingasa*, and that they differ in having the tail points more widely and squarely separated.

**HABITAT.**—Continental India and Burma except the Desert Tracts.

**DISTRIBUTION.**—We have taken both forms at Bombay, Poona, Khandalla, Alibagh, Matheran, and Purundur, all in the Bombay Presidency; we have it also from Raipur and Rangoon. Elwes reports it from Tavoy and Sikkim; de Nicéville from Calcutta and Chin Lushai; Doherty from Kumaun and Naini Tal; Hampson from the Nilgiris; Fergusson from Travancore; Mackinnon from Mussuri; de Rhé-Philippe from Lucknow; Manders from the Shan States; it is also in the B. M. from Malabar.

**NOTE.**—The females of all the forms have often a suffusion of dark yellow on the abdominal portion of the hindwings above.

## PARERONIA PINGASA.

Plate 608, figs. 1, ♂, 1a, ♀, 1b, ♂, 1c, ♀ (Wet-season Brood), 1d, ♂, 1e, ♀, 1f, ♂, 1g, ♀ (Dry-season Brood), 1h (Larva), 1i (Pupa).

*Eronia Pingasa*, Moore, Proc. Zool. Soc. 1872, p. 565.

*Nepheronia Pingasa*, Butler, Proc. Zool. Soc. 1881, p. 612. Hampson, Journ. As. Soc. Bengal, 1888, p. 363. Davidson and Aitken, Journ. Bo. Nat. Hist. Soc. 1890, p. 357. Davidson, Bell and Aitken, id. 1897, p. 573, pl. 6, fig. 4 (Larva), 4a (Pupa). Fergusson, id. 1891, p. 445.

*Pareronia Pingasa*, Bingham (part), Fauna of Brit. India, Butt. ii. p. 280 (1907).

*Nepheronia Compacta*, Butler, Cist. Ent. 1874, p. 235.

## Wet-season Brood (Figs. 1, ♂, 1a, ♀, 1b, ♂, 1c, ♀).

IMAGO.—Male. Upperside pale blue, brighter and slightly darker than in *Hippia*, veins more broadly black, especially the medial vein of the *forewing*, the costal band similar, the outer marginal band very broad, occupying more than a third of the wing, and quite spotless, the broadness of the band making the outer blue interspaces very short, especially those in front of the cell, which are very short. *Hindwing* with a similar broad outer band, the androconia scales not covering the whole band as they do in *Naraka* and *Ceylanica*, but gradually narrowing hindwards. Underside much paler and duller in colour, all the veins with pale blackish bands, a sub-marginal row of lunular blackish marks joined together, making a marginal series of large pale blue spots on both wings, edged on the extreme margin with pale blackish colour.

Female. Upperside black, with the stripes and spots disposed much as in *Hippia*, the former, however, are all very narrow. Underside as in the Wet-season form of *Hippia*.

Expanse, ♂ 3, ♀  $3\frac{2}{10}$  inches.

## Dry-season Brood (Figs. 1d, ♂, 1e, ♀, 1f, ♂, 1g, ♀).

Male. Upperside coloured as in the other form, the black bands on the veins thinner, the outer marginal bands much narrower, not as a rule broader than in the Wet-season form of *Hippia*. Underside very much paler, the black stripes on the wings almost obsolete except the sub-costal and median veins of the *forewing*.

Female with the stripes and spots disposed as in the Wet-season form, but much broader, the inner portion of the *hindwing* on the underside much whiter, the lower veins almost without markings.

Expanse, ♂  $2\frac{8}{10}$ , ♀  $3\frac{1}{10}$  inches.

LARVA.—Feeds on *Caparis Heyneana*, is long, cylindrical, or slightly depressed and tapering perceptibly from the head, which is large, to the tail, which ends in two short strong spines clothed with bristles; the body is clothed with very minute hairs, colour green, with a lateral row of conspicuous white spots, from the 5th to the 12th segment, and rows of smaller spots on the back.

PUPA.—Suspended by the tail and by a very long band, this is a curious object, the thoracic portion being bent back almost at right angles to the abdominal, and the head produced into a very long, sharp snout, while the wing cases form a keel nearly half an inch in depth, and so thin as to be almost transparent; colour a uniform pale watery-green. (Davidson and Aitken, Journ. Bo. Nat. Hist. Soc. 1890, p. 357.)

HABITAT.—South India.

DISTRIBUTION.—We have it from the Nilgiris, Malabar and Kanara Districts, and Fergusson recorded it from Travancore.

## PARERONIA NARAKA.

Plate 609, figs. 1, ♂, 1a, ♀, 1b, ♂, 1c, ♀ (Wet-season Brood), 1d, ♂, 1e, ♀, 1f, ♂, 1g, ♀ (Dry-season Brood).

*Eronia Naraka*, Moore, Proc. Zool. Soc. 1877, p. 591.

*Eronia Valeria*, var. *Naraka*, Wood-Mason and de Nicéville, Journ. As. Soc. Bengal, 1880, p. 237; id. 1881, p. 252.

*Pareronia Pingasa*, Bingham (part), Fauna of Brit. India, Butt. ii. p. 280 (1907).

Wet-season Brood (Figs. 1, ♂, 1a, ♀, 1b, ♂, 1c, ♀).

IMAGO.—Male. Upperside pale blue, a little darker than in *Pingasa* and of a clearer colour. *Forewing* with the veins not so broadly black, and the marginal band not much more than half as broad; always with one sub-apical pale small spot in it, sometimes with two, three or four minute dots in a row following, consequently the blue interspaces beyond the cell are much longer. *Hindwing* with the black veins much as in *Pingasa*, the exterior marginal black border quite as broad at the apex, but not nearly so even in width, narrowing gradually hindwards, the androconia scales covering the entire band. Underside much paler, whitish and dull in colour, with all the veins as on the upperside, but of a pale blackish colour, the sub-marginal row of blackish lunular spots and markings similar.

Female. Very different to the female of *Pingasa*, the vein stripes and outer border blackish-brown and not deep black as in that species, the pale interspaces broader; on the underside the *forewing* is similar, but the *hindwing* has no vein stripes, and there is a broad, outer marginal blackish border, containing a row of pale sub-marginal lunules.

Dry-season Brood (Figs. 1d, ♂, 1e, ♀, 1f, ♂, 1g, ♀).

Male. Upperside similarly coloured. *Forewing* with the black vein markings thinner, the exterior marginal black band much less at the apex and narrowing hindwards, the spots within it larger. Underside of a brighter bluish-white colour. *Forewing* with the vein markings similar, but narrower. *Hindwing* without black vein markings, the outer marginal markings on both wings, faintly indicated.

Female. Upperside with all the pale stripes broader, the spots larger, those on the *forewing* with a slight blue tint. Underside. *Forewing* similar. *Hindwing* without vein markings and with a broad blackish outer marginal border, diffuse on its inner side; both wings with thin, sub-marginal pale lunular marks.

Expanse, ♂  $2\frac{9}{10}$ , ♀  $3\frac{1}{10}$  inches.

HABITAT.—South Andaman Islands.

DISTRIBUTION.—In our collection and in the B. M. from Port Blair.

## PARERONIA CEYLANICA.

Plate 610, figs. 1, ♂, 1a, ♀, 1b, ♂, 1c, ♀ (Wet-season Brood), 1d, ♂, 1e, ♀, 1f, ♂, 1g, ♀ (Dry-season Brood).

*Eronia Ceylanica*, Felder, Reise Nov. Lep. ii. p. 191, ♂ only (1865). Wallace, Trans. Ent. Soc. 1867, p. 388.

*Nepheronia Ceylanica*, Moore, Lep. Ceylon, i. p. 138 (1881). Manders, Journ. Bo. Nat. Hist. Soc. 1904, p. 79.

*Pareronia Ceylanica*, Bingham (part), Fauna of Brit. India, Butt. ii. p. 281 (1907).

Wet-season Brood (Figs. 1 ♂, 1a, ♀, 1b, ♂, 1c, ♀).

IMAGO.—Male. Upperside bright pale blue. *Forewing* much as in *Pingasa*, the median and lower vein as broadly black-striped as the same form of that species, the outer marginal band not nearly so broad, but fairly uniform in width hindwards, and generally containing a row of small blue streaks, the apical and medial streaks the largest. *Hindwing* with the exterior band broader than in the *forewing* and very uniform, the veins about as broadly black as in *Pingasa*, the usual white costal space with blue at its base, the next one below it tipped with white, the androconia scales covering the entire outer band. Underside bright pale bluish, of a different tint to any of the preceding species, the sub-costal and median veins rather broadly black, as also veins 1, 2 and 3, all three ending with large black sub-marginal patches, outer band space darker than the rest of the wing enclosing a series of large pale spots. *Hindwing* almost clear, the upper vein markings showing slightly through the wing, and near the outer margin is a series of pale greyish lunules.

Female. Upperside dark blackish-brown, the sub-marginal spots smaller than usual, and all the streaks in the interspaces on both wings thin, of a greyish-white colour and more or less faintly indicated. Underside of a uniform dull pale blackish-brown colour, the spots larger, the streaks broader and rather more clearly indicated than they are above.

Expanse, ♂  $3\frac{2}{10}$ , ♀  $3\frac{3}{10}$  inches.

Dry-season Brood (Figs. 1d, ♂, 1e, ♀, 1f, ♂, 1g, ♀).

Male. Similar to the other form, on the uppersides the veins are much less heavily marked, and the outer band is much narrower and tapers somewhat hindwards on the forewing, on the underside it is duller in colour, the forewing has normal vein markings, and the patches at the ends of the veins 2, 3 and 4 are small. *Hindwing* without markings.

Female. Upperside with the stripes much broader and the spots larger. Underside whitish faintly tinged with blue, the stripes on both wings very broad, the inner

portion of the forewing blackish-brown. *Hindwing* with the whitish interspaces very broad, the veins with bluish-grey thin stripes and the outer border broadly bluish-grey with a sub-marginal row of large whitish spots.

Expanse, ♂  $2\frac{8}{10}$ , ♀  $3\frac{2}{10}$  inches.

HABITAT.—Ceylon.

NOTE.—The male figure is from Felder's type, kindly lent me by the Hon. Walter Rothschild; the Dry-season female figure is from an example in the Felder collection, but is not his female type.

#### PARERONIA FRATERNA.

Plate 611, figs. 1, ♂, 1a, ♀, 1b, ♂, 1c, ♀ (Wet-season Brood), 1d, ♂, 1e, ♀, 1f, ♂, 1g, ♀ (Dry-season Brood).

*Nepheronia Fraterna*, Moore, Lep. Ceylon, i. p. 139, pl. 54, figs. 3, ♂, 3a, ♀ (1881). Hampson, Journ. As. Soc. Bengal, 1888, p. 363. Fergusson, Journ. Bo. Nat. Hist. Soc. 1891, p. 444. Davidson, Bell and Aitken, id. 1897, p. 573.

*Nepheronia Ceylanica*, Bingham (part), Fauna of Brit. India, Butt. ii. p. 281 (1907).

*Eronia Ceylanica*, Felder, Reise Nov. Lep. ii. p. 191 (♀ only), (1865).

*Nepheronia Speculifera*, Moore, Lep. Ceylon, i. p. 139 (1881).

Wet-season Brood (Figs. 1, ♂, 1a, ♀, 1b, ♂, 1c, ♀).

IMAGO.—Male. Upperside darker and brighter blue than in *Ceylanica*, markings similar, the veins not nearly so broadly black, and the outer marginal band narrower. Underside similar, but the *hindwing* is immaculate.

Female very different to the Wet-season form of *Ceylanica*. Upperside deep black with a faint blue tinge, markings very much as in the Wet-season form of the female of *Hippia*, but all the pale stripes and spots tinged with blue; the lower cell stripe on the forewing club-shaped and very short, the discal stripe in the second interspace rounded at both ends, and the cell stripe of the hindwings with a distinct black line dividing it. Underside very different to any other Indian species of this genus; it is strongly blue-tinged. *Forewing* with the inner ground colour black, the stripes broad, the sub-apical stripes long and running into the sub-marginal spots, the general colour of the costal band and of the apical portion whitish tinged with blue, the marginal space is of the same colour, narrowing hindwards, and the cell stripe is outwardly split into three parts. *Hindwing* with very faint markings and with a series of large whitish lunulate sub-marginal spots.

Expanse, ♂  $2\frac{8}{10}$ , ♀  $3\frac{1}{10}$  inches.

Dry-season Brood (Figs. 1d, ♂, 1e, ♀, 1f, ♂, 1g, ♀).

Male. Upper and underside like the Wet-season form, but the veins are more thinly marked and the exterior bands above are narrower.

Female. Less tinged with blue above, all the stripes much broader and the spots larger, the cell stripe of the forewing split into three parts joined together basally, the cell stripe of the hindwing without the dividing line. Underside as in the other form, but paler.

Expanse, ♂  $2\frac{4}{10}$ , ♀  $3\frac{1}{10}$  inches.

HABITAT. — Ceylon and South India.

DISTRIBUTION.—We have both sexes of the Dry-season form, as figured, from Trincomali, Ceylon, and both sexes of the Wet-season form, as figured, from Madras; Fergusson reports it from Travancore, and Davidson, Bell and Aitken from Canara.

NOTE.—Bingham makes *Fraterna* a Dry-season form of *Ceylanica*, but the latter is not an Indian insect, the South Indian specimens of *Fraterna* are absolutely identical with the Ceylon examples, and with Moore's type-specimen which came from Ceylon; there are in our collection and in the B. M. both forms from Ceylon as well as from Southern India.

The figure of the Dry-season female is from Felder's type of his female *Ceylanica*, which corresponds with his description.

#### INDO-MALAYAN ALLIED SPECIES.

*Pareronia Phocaea*, Eronia Phocaea, Felder, Wien, Ent. Mon. v. p. 299 (1861); id. Reise Nov. Lep. pl. 27, figs. 5, 6 (1865). Habitat, Mindanao, Philippines.

*Pareronia Valeria*, Eronia Valeria, Wallace, Trans. Ent. Soc. 1867, p. 388. *Pontia Valeria*, Horsfield, Cat. Lep. E.I.C. p. 139 (1829). Habitat, Java.

*Pareronia Lutescens*, Nepheronia Lutescens, Butler, Cist. Ent. ii. p. 431 (1879). Habitat, Borneo.

*Pareronia Octavia*, Eronia Octaviae, Snellen, Tijd. voor Ent. xxxvii. p. 68, pl. 3, fig. 3 (1895). Habitat, Tanah-Djampier.

*Pareronia Niasica*, Nepheronia Valeria Niasica, Fruhstorfer, Berl. Ent. Zeit. 1899, p. 34. Habitat, Nias.

*Pareronia Palawana*, Nepheronia Valeria Palawana, Fruhstorfer, l.c. Habitat, Palawan, Philippines.

*Pareronia Leona*, Nepheronia Valeria Leona, Fruhstorfer, Iris, 1903, p. 97. Habitat, West Java.

*Pareronia Persides*, Nepheronia Valeria Persides, Fruhstorfer, Iris, 1903, p. 98. Habitat, Tonkin.

*Pareronia Oder*, Nepheronia Hippia, sub sp. Oder, Fruhstorfer, Soc. Ent. 1903, p. 42. Habitat, Tonkin, Siam.

*Pareronia Kangeana*, Nepheronia Valeria Kangeana, Fruhstorfer, Scp-Abzüge aus Soc. Ent. Jahrg. 1903, p. 124; id. Stett. Ent. Zeit. 1904, p. 347. Habitat, Java.

## Family LYCÆNIDÆ.

Butterflies of small size, and mostly of very beautiful colour, the females are almost always of a duller colour than the males, browns and blacks usually ; in size they include the smallest known butterflies, some species being not more than half an inch in expanse of wings ; often the species occur in very great quantities ; one species, *Liphyra brassolis*, Westwood, is as aberrant in size as it is in other characters, being over three inches in expanse ; the larvæ and eggs of the *Lycænidæ* are very distinctive and denote their reality as a well-defined and separate family of the Rhopalocera. Mr. W. Doherty, who gave much time to the study of the eggs of butterflies, has described in detail the eggs of this family, and attempted a division of sub-families based on their shape and peculiarities ; and his paper, published in the Journal of the Asiatic Society of Bengal, 1886, p. 110, is worth careful study and is very instructive ; he divides the family into six sub-families, and his sub-divisions correspond very closely with those of Bingham, published in the Fauna of British India, Butt. ii. p. 284 (1907), which are very carefully worked out on the wing venation and general construction of the different groups.

The larvæ of the *Lycænidæ* have had much attention paid them ; de Nicéville, Davidson, Bell, Aitken and Bingham in India, and Trimen in Africa have very carefully studied the life history of many species ; de Nicéville says (p. 7) that some of the larvæ are furnished with certain organs which are found in no other larvæ of Lepidoptera ; this organ consists of an oval opening on the dorsal line of the eleventh segment, with lips like a mouth ; these lips can at the will of the larvæ be somewhat protruded, and a drop of sweet liquid exuded. On the twelfth segment are two other organs, one on each side, in the sub-dorsal region. In the genus *Curetis*, Hübner, which does not possess the mouth-like organ on the eleventh segment, these two organs are of very great size and are much more developed than in any other species. Each organ consists of a tall pillar, from which, when the larva is touched or frightened, is instantly protruded a long tentacle furnished at its head with a brush of long parti-coloured hairs as long as itself ; these hairs open out into a rosette, and the tentacle is whorled round with immense rapidity, producing a curious effect, probably to frighten away their enemies, the worst of which are ichneumon flies ; they are not attended by ants, not having the organ on the eleventh segment which exudes the sweet liquid ; in those forms that have this organ the larvæ are so attended, who, in return for the food they obtain from the larvæ, act as their most efficient guardians ; the ants gently stroke the larvæ with their antennæ and feed on the fluid exuded, and they will furiously attack anything interfering with these larvæ ; de Nicéville gives a very

interesting description of his and Mrs. Wylly's observations on this subject in the Journal of the Bombay Natural History Society, vol. iii. p. 164 (1888). The larvæ of some species are carnivorous. In a note by Thwaites, he says it is difficult to realise that the larvæ of some of these lovely Lycaenidæ, such as *Amblypodia*, etc., are carnivorous or even cannibal in their habits, and do not hesitate to eat their own brethren of the same brood when any of the latter are commencing their change into the inactive chrysalis state, with their consequent inability to protect themselves from their voracious kindred, who devour them with avidity. de Nicéville says (p. 55) that Green (who is a very careful observer) states that the larvæ of *Spalgis epius* are carnivorous; and James L. Courtice, in Ent. Mo. Mag. 1865, p. 45, gives an account of the cannibalism of *Zephyrus quercus*; he says, "On the 27th May, one had changed to chrysalis in a corner of the shade, and I observed a larva attached to the tail end of it, and evidently very busily engaged. I disturbed him, and found that he had not only eaten off the end of the chrysalis, but had cleaned the contents of it right out; and what still more astonished me was that, after being disturbed, he returned resolutely to the attack, and finished up the greater part of the pupa shell."

With reference to the pupæ, de Nicéville says they are usually attached by the cremaster which forms the terminal portion of the pupa, and is furnished with minute hooks for attachment to the pad of silk previously spun for that purpose by the larva, and by a silken girth round the middle of the body to whatever surface the larvæ choose on which to perform their transformation; in some forms, however, the pupæ are freely suspended by the tail, and Trimen notes the same, remarking that the pupæ of some Lycaenidæ are attached by the tail only in a fixed horizontal or slightly inclined position. Some forms of pupæ are hidden in the ground, Trimen says, but de Nicéville remarks that this is certainly true in the case of some Indian species, the larvæ of which are attended by ants, as the latter drive the larvæ into their nest, when they turn to pupæ in the usual way, being attached to the trunk of the tree by a tail or a girdle, the ants having constructed a temporary nest around the base of the tree.

The butterflies of this family are often found in open meadow or grass land, but by far the greater number of forms frequent trees and bushes, especially open paths and the edges of forests; the males are sometimes to be seen in great numbers on damp sandy ground and the sides of streams, sucking up the moisture, and they have the habit of rubbing the hindwings one over the other, when first settling, the motion being apparently more or less rotary. Trimen notes on the subject: "This curious habit is practised by every member of the family that I have watched when settled, and it seems not improbable that the movement may serve to accentuate their ornaments, either in rivalry or menace." Seudder thinks that the action may cause a stridulation which, though inaudible to our ears, may be heard by insects; most of the Lycaenidæ close their wings when at rest, as do other butterflies, but this is not

always the case, some species rest with wings fully expanded or half open to show off the brilliant colouring of the upperside ; their flight is as a rule extremely rapid, so rapid that the eye can scarcely follow them, but the flights are usually short, the species that live in the grass have usually a weak flight.

Sexual dimorphism is rare, Leech records that *Zephyrus japonica*, Murray, has four distinct forms of females with many intergrades. We know of none from the Indian region, whereas, on the other hand, seasonal dimorphism seems to be as common as it is in the butterflies of other families.

In determining a sub-division of this very interesting family and the order in which they and the species they contain should stand, we have had much difficulty. Dr. Moore left a number of notes, but they refer only to individual species, and are under no arrangement whatever ; de Nicéville described eighty-two genera and over four hundred species, but he classified no sub-families, contenting himself with only distinguishing certain groups of genera. These agree fairly well with the groups Doherty had previously characterised from the egg alone. In 1884, in his grand work, "Rhopalocera Malayana," Distant proposed a division of the genera into three groups, founded more or less on the presence or absence of tails to the hindwings, but this system of grouping cannot hold, because there are undoubtedly some genera, such as *Arhopala*, in which some of the species have tails and some have not. Dr. T. A. Chapman has, however, been working on the genitalia of many Lycænids, his excellent paper in the Proceedings of the Zoological Society, 1909, part ii. has thrown entirely new light on the subject, and we are attempting to arrange the order of this family in accordance with his views and with those of Mr. J. W. Tutt, in his work on British Butterflies.

**IMAGO.**—Usually of small size, body generally slender, six perfect legs, forelegs somewhat smaller than the others, nearly alike in both sexes, the forelegs in the males furnished with an exarticulate tarsus having several hooklets at the tip, distinct from the unguis ; palpi variable in length, often longer in the female than in the male ; antennæ generally shorter than half the length of the costa of the forewing, often ringed with white, with an elongated club. Eyes often more or less hairy. *Forewing* with two or three branches to the sub-costal vein, rarely four, vein 8 absent in all but three genera in the Indian forms, and in the females but not the males of three others, discoidal cell closed, generally narrow, owing to the distance between the costal and sub-costal nervures, wing rather broad and short, the apex and hinder angle well marked, seldom rounded. *Hindwing* with the outer margin often furnished with one or more slender tails near the anal angle, precostal nervure absent, discoidal cell closed by very slender nervules.

Eggs hard, small, numerous, much wider than high, reticulate, with a whitish accretion, forming an asymmetrical network of tetragons (Doherty).

LARVA shaped like wood-lice, extremely sluggish for the most part, and look in many cases more like a *Coccus* or some other vegetable excrescence than caterpillars, some are smooth, many clothed with a soft down, some with fascicles of short bristles, or regularly disposed tubercles, and a few, hairy generally; several are regularly corrugated dorsally, and others prominently humped in one or two places; some larvæ of Lycenidæ are scutate, being furnished with a hard flattened shield on the dorsal region of the three last segments, which is used by the larvæ to plug up the holes in the fruits in the interior of which they live. The majority of the larvæ feed on the young leaves, buds, and flowers of trees, bushes and low-growing plants. *Lampides*, *Virachola* and *Deudorix*, however, feed on the interior of fruits of several kinds, some feed upon the seed pods of leguminous plants; these latter have very long necks, so that they can reach far into the interior of the pods (de Nicéville).

PUPA.—Usually very blunt, never furnished with spines or processes, though they are often densely covered with short hairs or bristles; much rounded anteriorly, the thorax rounded and often humped, generally dull coloured, of various shades of red or brown or green.

### Sub-Family GERYDINÆ.

IMAGO.—Coloration dull, brown or blackish-brown, white or marked with white in most females; wings mostly elongate and delicate. *Forewing* with vein 8 absent. *Hindwing* with all the veins present; outer margin of both wings sometimes uneven, sometimes dentate; abdomen slender, usually extending beyond the wings; antennæ half the length of the costa of forewings; club gradual; palpi with the third joint long and slender; legs long, abnormal, the first joint of the tarsi elongate. The genitalia of the male, Doherty says, are peculiar, the prehensoræ long, thin and plate-like, resembling the valves of the *Papilionidæ*.

EGG.—Less than one-third as high as wide, delicately and somewhat obsolescently reticulate, sometimes carinate, flat above and below (Doherty).

LARVÆ and PUPÆ unknown.

### Genus GERYDUS.

*Gerydus*, Boisduval, Sp. Gen. Lep. i. pl. 23, fig. 2 (1836). Distant, Rhop. Malayana, p. 205 (1884). de Nicéville, Butt. of India, iii. p. 21 (1890). Bingham, Fauna of Brit. India, Butt. ii. p. 288 (1907).

*Symetha*, Horsfield, Cat. Lep. E.I.C. p. 59, pl. 2, fig. 2 (1828).

*Miletus*, Westwood (part, nec Hübner), Gen. Diurn. Lep. ii. p. 502 (1852).

IMAGO.—Eyes naked, palpi slender, scaled, not fringed in front, third joint long, antennæ less than half the length of the costa of forewings, club long and slender, abdomen of the male with a sub-anal tuft of stiff hairs; legs abnormal, first joint of tarsi

elongated, widened and compressed; claws minute. *Forewing* long and narrow, costa well arched, apex acute, hinder margin bisinuate more than three-fourths the length of the costa, vein 5 arising equidistant between veins 4 and 7, vein 6 from underside of 7 beyond end of cell, upper discocellular therefore absent, vein 8 absent, 9 from the middle of 7, 10 from sub-costal a little before apex of cell, 10 ending on costal margin above upper end of the cell. *Hindwing* long, pear-shaped, costa arched near apex and base, outer margin rounded, lower angle rounded, abdominal margin nearly straight; cell short, discocellulæ faintly indicated, vein 6 from 7 beyond upper end of cell, 8 long and strongly curved at base, thence bisinuate to apex.

Type, *Gerydus symethus*, Cramer.

#### GERYDUS SYMETHUS.

Plate 612, figs. 1, ♂, 1a, ♀, 1b, ♀.

*Papilio symethus*, Cramer, Pap. Exot. ii. pl. 149, figs. B, C, ♀ (1779). Stoll. Suppl. Cramer, pl. 37, figs. 3, 3c, ♀ (1790). Fabricius, Sp. Ins. ii. p. 119 (1781); id. Mant. Ins. ii. p. 69 (1787).

*Hesperia symethus*, Fabricius, Ent. Syst. iii. (i.) p. 280 (1793).

*Polyommatus symethus*, Godart, Enc. Méth. ix. p. 675 (1823).

*Gerydus symethus*, Boisduval, Sp. Gen. i. pl. 23, figs. 2, ♀, 2a, 2b, tarsi fore leg, ♂ ♀ (1836). Butler, Cat. Fabr. p. 160 (1869); id. Trans. Linn. Soc. Zool. 1877, p. 546. Distant, Rhop. Malayana, p. 205, pl. 20, fig. 2, ♂, pl. 22, fig. 14, ♀ (1884). de Nicéville, Butt. of India, iii. p. 22 (1890). Watson, Journ. Bo. Nat. Hist. Soc. 1891, p. 43. Elwes, Proc. Zool. Soc. 1892, p. 617. Bingham, Fauna of Brit. India, Butt. ii. p. 290 (1907).

*Myletus symethus*, Snellen, Tijds. voor Ent. xix. p. 152 (1876).

*Symetha pandu*, Horsfield, Cat. Lep. E.I.C. pl. 2, figs. 2, ♂, 2a, ♀, 2b to 2i (structure of imago) (1828).

*Miletus zinckenii*, Felder, Reise, Nov. Lep. ii. p. 284, pl. 35, fig. 34, ♂ (1865).

IMAGO.—Male. Upperside blackish-brown. *Forewing* with a large white patch in the centre, its upper margin having a small tooth projecting upwards in its middle, its borders irregularly sinuous, a long white streak immediately below the patch, sometimes attached to it, sometimes more or less separated; the upper, apical, and outer portions of the wing darker blackish. *Hindwing* uniform blackish-brown, a broad whitish streak beyond the cell, sometimes extending nearly to the outer margin, often obscure, sometimes absent. Underside very pale with an ochreous tinge. *Forewing* with the patch as above, often larger, a blackish patch on the lower basal half; obscure, transverse, sinuous pale lines, two at base, and two or three on the costal apical area, a sub-terminal series of slightly lunular small brown marks. *Hindwing* crossed by a number of obscure, sinuous, brown and whitish lines, a sub-terminal series of brownish slender lunules, the centre of the wing generally the palest.

Female. Upperside. *Forewing* with the basal portion irrorated with dark greyish-brown scales, the white patch very large, occupying more than two-thirds of the wing, its outer margin very irregular, the patch sometimes intersected by the veins; basal half of costal band broadly greyish-brown, the remainder black, extending round the apex and outer margin, and running in on the hinder margin, where in the middle it joins the grey irrorations, this outer band at the apex is very broad and is black throughout. *Hindwing* greyish-brown, sometimes very pale, costal margin very broadly blackish, a white patch in the middle of the wing which is sometimes more or less suffused with grey and varies much in size. Underside, much as in the male. *Forewing* with the white patch as large as it is above. *Hindwing* with the discal sinuous brown line more pronounced, a short brown shade through it from the abdominal margin, and both wings with lunular sub-terminal brown marks. Antennæ, head, thorax and abdomen brown, paler beneath, palpi and thorax beneath white.

Expanse of wings, ♂ ♀  $1\frac{8}{10}$  inches.

HABITAT.—Burma, Malacca, Java, and many of the adjacent islands.

DISTRIBUTION.—Recorded by Elwes from the Naga and Karen Hills, by Butler from Maulmein, and by Watson from Chin Lushai; it is in the B. M. from Java.

#### GERYDUS ANCON.

Plate 612, figs. 2, ♂, 2a, ♀, 2b, ♂, 2c, ♀.

*Gerydus ancon*, Doherty, Journ. As. Soc. Bengal, 1889, p. 438, pl. 23, fig. 8. de Nicéville, Butt. of India, iii. p. 23 (1890). Bingham, Fauna of Brit. India, Butt. ii. p. 291 (1907).

IMAGO.—Male. *Forewing*, upperside, dark brownish-black at the base, a white transverse band, which commences with a sub-costal streak near the base, and descends outwardly before the middle of the wing, is crossed by a broad bar from the basal brown space which becomes nearly pure black; then the white band expands inwards on to the hinder margin very broadly, its inner and outward edges being very irregularly sinuous; all the broad black marginal band being pure black, being very broad at the apex and gradually narrowing to the hinder angle. *Hindwing* of a uniform very dark brownish-black colour, without markings. Underside. *Forewing* chocolate-brown, the white band much reduced, macular, and almost continuous, with blackish suffusion inside it, on the centre of the wing and some similar suffusion outside the band, above its middle; the outer portion of the wing with pale streaks. *Hindwing* of a uniform rather pale chocolate-brown, some obscure mottlings of a darker brown, and a brown, obscure band from the abdominal margin beyond the middle, which becomes more or less obsolete inwards.

Female, like the male. The white band slightly narrower hindwards.

Antennæ, head, thorax and abdomen pale brown above, more or less ochreous tinged beneath.

Expanse of wings, ♂ ♀ 2 inches.

HABITAT.—Tenasserim, Tavoy, Burma.

#### GERYDUS BOISDUVALI.

Plate 613, figs. 1, ♂, 1a, ♀, 1b, ♂ (Wet-season Brood), 1c, ♂, 1d, ♀, 1e, ♀ (Dry-season Brood).

*Miletus boisduvali*, Moore, Cat. Lep. E.I.C. p. 19, pl. 1a, fig. 1, ♀ (1857); id. Proc. Zool. Soc. 1865, p. 777. Snellen, Tijd. voor Ent. xix. p. 152 (1876). Elwes, Trans. Ent. Soc. 1888, p. 374.

*Gerydus boisduvali*, de Nicéville, Butt. of India, iii. p. 24, pl. 26, fig. 155, ♂ (1890). Manders, Trans. Ent. Soc. 1890, p. 527. Watson, Journ. Bo. Nat. Hist. Soc. 1891, p. 43. Elwes, Proc. Zool. Soc. 1892, p. 618. H. H. Druce, Proc. Zool. Soc. 1895, p. 561 (note). Swinhoe, Trans. Ent. Soc. 1893, p. 292. Watson, Journ. Bo. Nat. Hist. Soc. 1897, p. 658. Bingham, Fauna of Brit. India, Butt. ii. p. 292 (1907).

*Miletus chinensis*, Felder, Verh. zool.-bot. Ges. Wien, xii. p. 488 (1862); id. Reise, Nov. Lep. ii. p. 284, pl. 35, figs. 35, 36 (1865). Moore, Proc. Zool. Soc. 1878, p. 701.

*Miletus irroratus*, Druce, Proc. Zool. Soc. 1874, p. 106.

*Gerydus boisduvali*, var. *acragas*, Doherty, Journ. As. Soc. Bengal, 1891, p. 186.

*Gerydus chinensis*, J. J. Walker, Trans. Ent. Soc. 1895, p. 460. Kershaw, Trans. Ent. Soc. 1905, p. 1, pl. 1 (life history).

Wet-season Brood (Figs. 1 ♂, 1a, ♀, 1b, ♂).

IMAGO.—Male. Upperside of a nearly uniform blackish-brown colour. *Forewing* with an obscure discal band of small whitish spots, one or two obliquely, beyond the cell and two below them nearer the margin, these spots mostly suffused with scales of the ground colour, sometimes nearly obsolete. *Hindwing* without markings, cilia white. Underside, pale pinkish-grey. *Forewing* with an obscure and irregular whitish patch on the lower half of the disc, three spots in the cell, caused by six whitish lines crossing it, a similar spot below the middle of the cell, some similar but smaller sub-costal spots, four joined together from the costa near the apex, three below them, and a series of sub-terminal brown spots. *Hindwing* with basal, sub-basal and medial bands of spots, similar to those on the forewing, a discal band of similar spots joined together, and a sub-terminal angulated brown line.

Female. Above and below similar to the male, but the band on the forewing above is better pronounced, and the spots larger, but often much suffused.

Expanse of wings, ♂ ♀  $1\frac{1}{2}$  inches.

Dry-season Brood (Figs. 1c, ♂, 1d, ♀, 1e, ♀).

Male. Much paler than the Wet form, the band is broad and continuous from near the costa of forewing, outwards almost joining the two lower spots, the portion of

the wing outside this band is dark blackish-brown, nearly black, but all the inner portion and the hindwing are pale pinkish-brown, a little darker brown occasionally ; on the underside there is a brown shaded streak from the base inwards on the forewing, and a similar streak on the hindwings extending inwards from the middle of the abdominal margin.

Female, similar to the male.

Antennæ, head, thorax and abdomen above and below brown.

Expanse of wings, ♂ ♀,  $1\frac{5}{16}$  inches.

HABITAT.—Sikkim, Assam, Burma, Hong Kong, Ceylon, extending to Java.

DISTRIBUTION.—Watson records it from the Chin Hills and Chin Lushai, Elwes from North Assam and the Karen and Naga Hills, Manders from the Shan States ; it is in the B. M. from Hong Kong, Ceylon and Java, and in our collection from the Khasia Hills.

#### GERYDUS LONGEANA.

Plate 613, figs. 2, ♂, 2a, ♀, 2b, ♂, 2c, ♀.

*Gerydus longeana*, de Nicéville, Journ. Bo. Nat. Hist. Soc. 1898, p. 141, pl. Z, figs. 15, 16.

Bingham, Fauna of Brit. India, Butt. ii. p. 293 (1907).

Wet-season Brood (Figs. 2, ♂, 2a, ♀, 2b, ♂, 2c ♀).

IMAGO.—Male. Upperside pale blackish-brown with a slight ochreous tint. *Forewing* with the space beyond the white discal band black, the band consisting of an oblique rather broad streak across the end of the cell, and two somewhat elongate spots below it, nearer the margin. *Hindwing* unmarked. Underside of a uniform very pale brownish-grey, tinged with ochreous, markings very obscure, much as in *hoisduvali* ; the white discal band of the forewing broader throughout and much enlarged hindwards.

Female, like the male, the discal band very much broader, consisting of four elongated white streaks of uniform size ; on the underside the markings are better defined.

Expanse of wings, ♂ ♀  $1\frac{1}{2}$  inches.

#### Intermediate Form.

Male, with the space on *forewing* beyond the white band black, the band purer white, very broad, evenly curved, the spots closer together and narrowing hindwards, the inner portion of the wing and the entire hindwing pale whitish-grey with a pinkish-ochreous tinge, a short brown streak, immediately above the upper half of the cell, and another in the interspace above vein 2, extending from its origin to the white band ; the hindwing with the costa broadly blackish-brown, unmarked. Under-

side as in the other form, the discal band much as on the upperside, the ground colour of both wings somewhat darker, a discal obscure brown transverse shade on the hindwing.

Female. *Forewing* with the base ochreous-grey, the outer band black and as in the male; the remainder of the wing white, containing the two brown streaks as in the male. Underside similar to the male.

Expanse of wings, ♂ ♀  $1\frac{1}{2}$  inches.

#### Dry-season Brood.

Male. Upperside nearly all white except the outer black band of the *forewing*, markings as in the female of the intermediate form; some slight ochreous-grey suffusion on the basal and abdominal portions of the *hindwing*. Underside pale.

Female, almost pure white above, the central brown bar on the *forewing* above very small and obscure, the suffusion on the *hindwing* hardly visible. Underside as in the male.

Expanse of wings, ♂ ♀  $1\frac{2}{5}$  to  $1\frac{3}{5}$  inches.

HABITAT.—Burma.

DISTRIBUTION.—The type came from Hsipaw in the Shan States; there is a fine series of all three forms in the B. M. from Thyetmyo, Chindwin, Beeling, and Tilin Yaw.

#### GERYDUS CROTON.

Plate 614, figs. 1, ♂, 1a, ♀, 1b, ♂, 1c, ♀.

*Gerydus Croton*, Doherty, Journ. As. Soc. Bengal, 1889, p. 439, pl. 23, fig. 9. de Nicéville, Butt. of India, iii. p. 25 (1890). Elwes, Proc. Zool. Soc. 1892, p. 617. Bingham, Fauna of Brit. India, Butt. ii. p. 294 (1907).

IMAGO.—Male. Upperside. *Forewing* rich dark brown, the apical portion beyond the white band black; the white band consists of one elongated, rather large spot beyond the cell, with two round white spots below it, nearer the outer margin. *Hindwing* of a uniform similar rich brown colour without markings. Underside paler brown, more or less uniform in colour throughout both wings. *Forewing* with the discal band much as on the upperside, sometimes the spots are a little larger, and often tinged with ochreous, some obscure annular markings on the costal and apical areas. *Hindwing* crossed with several very obscure annular bands, sometimes almost indistinguishable, both wings with a sub-terminal line of minute black dots.

Female paler in colour than the male, the white discal band of the forewing broader, the elongated spot beyond the cell becoming broader and forms a band which

extends up to the costa a little before the middle. Underside much paler and tinged with chocolate colour. *Forewing* with the discal band consisting of four elongated spots in the disc, increasing in size upwards, a black patch just inside them. *Hindwing* with some very obscure annular markings, both wings with minute sub-terminal black dots as in the male. Antennæ, head, thorax and abdomen dark brown above, paler beneath.

Expanse of wings, ♂ ♀  $1\frac{8}{10}$  inches.

HABITAT.—Burma.

DISTRIBUTION.—Elwes records it from Pegu; it is in the B. M. from the Shan States; the type came from Tenasserim.

#### GERYDUS BIGSII.

Plate 614, figs. 2, ♂, 2a, ♀, 2b, ♂, 2c, ♀.

*Gerydus bigsii*, Distant, Rhop. Malayana, p. 206, pl. 22, fig. 12, ♀ (1884). de Nicéville, Butt. of India, iii. p. 24 (1890). Watson, Journ. Bo. Nat. Hist. Soc. 1891, p. 43. Elwes, Proc. Zool. Soc. 1892, p. 617. H. H. Druce, Proc. Zool. Soc. 1895, p. 560. Watson, Journ. Bo. Nat. Hist. Soc. 1897, p. 657. Bingham, Fauna of Brit. India, Butt. ii. p. 295 (1907).

*Gerydus gopara*, de Nicéville, Butt. of India, iii. p. 25 (1890); id. Journ. Bo. Nat. Hist. Soc. 1890, p. 208, pl. E, figs. 1, ♂, 2, ♀.

IMAGO.—Male. Upperside of a uniform dark blackish-brown. *Forewing* with the apical portion darker black; the white discal streak crossing outside the end of the cell, descends hindwards, less obliquely than is usual in the genus, and therefore is more in the middle of the wing, it is more like a bar, and is very broad and extends from near the costa at its middle to near the hinder margin of the wing, there are no other markings on either wings above, but the outer margin of the hindwing is distinctly sinuous, which is very unusual in the males of this group. Underside pale brownish-grey with a faint pinkish tinge. *Forewing* with the white band forming a large white patch, a blackish suffusion on the wing in the inner portion, the usual markings on forewings better defined than in *boisduvali*, very obscure on the hindwing; a sub-terminal series of black dots.

Female, like the male. Antennæ, head, thorax and abdomen brown above and below.

Expanse of wings, ♂ ♀  $1\frac{1}{2}$  inches.

HABITAT.—Burma, Malay Peninsula.

DISTRIBUTION.—Watson records it from the Chin Hills and Chin Lushai, Elwes from the Naga and Karen Hills; it is in the B. M. from Thyetmyo, the Malay Peninsula and Java, and we have it from Celebes.

## GERYDUS ASSAMENSIS.

Plate 614, figs. 3, 3a, ♂.

*Gerydus irroratus*, var. *assamensis*, Doherty, Journ. As. Soc. Bengal, 1891, p. 37, pl. 1, fig. 7.*Gerydus irroratus*, Bingham (part), Fauna of Brit. India, Butt. ii. p. 295 (1907).

IMAGO.—Above unmarked except by a small, pale, longitudinal area around the base of the upper median vein on the forewing. Below pale grey-brown, without the dark markings of *G. boisduvali*; a small pale area on the forewing below the middle median vein, the markings lunular, those in the cell of the forewing reduced, the transverse discal band of the forewing sub-apical, extending only to the upper median vein, a single conspicuous dark lunule near the lower angle; the transverse band of the hindwing regular, an undulated, continuous sub-marginal dark line.

It resembles *G. melanion* from the Philippines, but is without the white area near the lower angle of the forewing above.

The figure represents the transverse band of the hindwing incorrectly; it is really composed of separate annular lunules (Doherty, l.c.).

HABITAT.—Dhansiri Valley, Naga Hills.

We have not seen this species; the unique type is in the Indian Museum, Calcutta; the figure is copied from Doherty's figure.

## ALLIED INDO-MALAYAN FORMS.

*Gerydus leos*, Simethius leos, Guérin, Voy. Coq. pl. 18, fig. 8 (1829). *Synonym*, *Gerydus teos*, Doherty, Journ. As. Soc. Bengal, 1891, p. 185. Habitat, Salaya Isl., Celebes, Amboina, Sumba.

*Gerydus melanion*, Miletus melanion, Felder, Reise, Nov. Lep. ii. p. 284, pl. 35, figs. 32, 33 (1865). Habitat, Philippines.

*Gerydus learchus*, Miletus learchus, Felder, l.c. p. 285, pl. 35, figs. 35, 37 (1865). *Synonym*, *Miletus philippus*, Staudinger, Lep. Palawan, p. 92, pl. 1, fig. 2 (1889). Habitat, Cochin China, Philippines.

*Gerydus petronius*, Distant and Pryer, Ann. Mag. Nat. Hist. 1887, p. 266. H. H. Druce, Proc. Zool. Soc. 1895, p. 559. Habitat, Borneo.

*Gerydus maximus*, Holland, Proc. Boston Soc. xxv. p. 68, pl. 5, fig. 9 (1891). Habitat, Celebes.

*Gerydus heracleon*, Doherty, Journ. As. Soc. Bengal, 1891, p. 36. Elwes, Proc. Zool. Soc. 1892, p. 617. Habitat, Perak.

*Gerydus gigantes*, de Nicéville, Journ. As. Soc. Bengal, 1894, p. 23, pl. 5, fig. 1, ♂, 13, ♀. Habitat, N.E. Sumatra.

*Gerydus goetulus*, de Nicéville, l.c. p. 24, pl. 5, fig. 12, ♀. Habitat, N.E. Sumatra.

*Gerydus gallus*, de Nicéville, l.c. p. 25, pl. 5, f. 11, ♀. Habitat, N.E. Sumatra.

*Gerydus gæsa*, de Nicéville, Journ. Bo. Nat. Hist. Soc. 1895 (vol. x.), p. 26, pl. 8, fig. 16, ♂. Habitat, N.E. Sumatra.

*Gerydus gigas*, H. H. Druce, Proc. Zool. Soc. 1895, p. 559, pl. 31, fig. 3, ♂. Habitat, Kina Balu, Borneo.

*Gerydus innocens*, H. H. Druce, l.c. p. 560, pl. 31, fig. 4. Habitat, Kina Balu.

*Gerydus vincula*, H. H. Druce, l.c. p. 561, pl. 31, figs. 9, ♂, 10, ♀. Habitat, Borneo.

*Gerydus improbus*, H. H. Druce, l.c. 1896, p. 651, pl. 29, figs. 1, ♂, 2, ♀. Habitat, Kina Balu.

#### Genus ALLOTINUS.

*Allotinus*, Felder, Reise, Nov. Lep. ii. p. 285 (1865). de Nicéville, Butt. of India, iii. p. 27 (1890).

Bingham, Fauna of Brit. India, Butt. ii. p. 296 (1907).

*Paragerydus*, Distant, Rhop. Malayana, p. 207 (1884).

*Miletographa*, Röber, Ex. Schmett. ii. p. 277 (1891).

IMAGO.—Differs from the genus *Gerydus* in having the first joint of the tarsi greatly elongated, round, not widened and compressed as in *Gerydus*; eyes naked. *Forewing*, cell about half as long as the wing; vein 6 from basal third of 7 beyond apex of cell; vein 8 absent; vein 9 from upper fifth of 7; 10 from upper end of cell; 11 from apical half of sub-costal. *Hindwing* long, oval, outer margin curved, slightly dentate. Antennæ more than half the length of the costa of forewing, club gradual, palpi erect, slender, aciculate; body long and slender.

Type, *Allotinus fallax*, Felder, from the Philippines.

#### ALLOTINUS DRUMILA.

Plate 615, figs. 1, ♂, 1a, ♀, 1b, ♂, 1c, ♀.

*Miletus drumila*, Moore, Proc. Zool. Soc. 1865, p. 777, pl. 41, fig. 12, ♀.

*Allotinus drumila*, de Nicéville, Butt. of India, iii. p. 28 (1890). Bingham, Fauna of Brit. India, Butt. ii. p. 297 (1907).

*Miletus insignis*, Staudinger, Ex. Schmett. p. 269, pl. 94 (1888).

IMAGO.—Male. With the shape of the wings like a female, short, broad. *Forewing* with the costa much arched before the apex, which is produced to a point, outer margin of forewing slightly crenulate, of the hindwing highly so = *Miletographa*.

Upperside dark brown. *Forewing* with a white streak, from the outer end of the cell, curving outwards and downwards into the interspace above vein 2, being broken by some brown suffusion on vein 3, the apex, outer margin and space below the streak darker brown, nearly black. *Hindwing* with the costal margin pale, a broad black streak below the pale portion; no other markings; underside pinkish-grey, a whitish streak along the hinder margin beyond the middle, all the rest of the wing with brown irrorations, which are thickest and darkest along the costal and marginal spaces, the latter limited by a thin very dark transverse band from the hinder margin near the angle, and stopping short of the costa; cell with three transverse bars of dark brown, the middle bar continued below the cell to the hinder margin. *Hindwing* darker in colour, with many dark brown irrorations and mottlings and some dark brown,

irregular, transverse bands, the first sub-basal, disconnected in its middle, the second and third short, from the centre of the wing to the costa, before which they meet, the third from the abdominal margin near the angle right across the wing. Antennæ brown, pale below with brown rings, a long white streak below the club, and the tips white, head and body brown.

Female. With the black outer band of the forewing and the broad costal black band of the hindwing similar in shape to those of the male, but all the rest of both wings is white above and below; on the upperside on the forewing there is some ochreous-grey suffusion at the base, and there is a sub-costal band of the same colour from the base to the apical black band; the hindwing is without markings except for a terminal somewhat suffused line of the same colour, but some examples are without it; on the underside there is some ochreous-grey suffusion, on the outer margin of the forewing and the hindwing is more or less entirely suffused with this colour, the centre portion being paler than the borders; all the markings are more or less obsolescent, but those that can be distinguished are identical with the markings of the male, except that the lower band on hindwings below, which stop in the middle of the wing, has two teeth pointing hindwards.

Expanse of wings, ♂ ♀ 2 inches.

HABITAT.—Sikkim, Assam, and Bhutan.

The females appear to be commoner than the males; we have one from the Khasia Hills, and there is one in the Hewitson Collection in the B. M. without locality. Moore described the male of *multistrigatus* as the male of this species.\* We have examined his type in the B. M., and de Nicéville and those that followed him do not appear to have seen the true male.

#### ALLOTINUS MULTISTRIGATUS.

Plate 615, figs. 2, ♂, 2a, ♀, 2b, ♂, 2c, ♀.

*Allotinus multistrigatus*, de Nicéville, Journ. As. Soc. Bengal, 1886, p. 253, pl. 11, figs. 11 and 2, ♂ ♀.

Doherty, Journ. As. Soc. Bengal, 1886, p. 131. Elwes, Trans. Ent. Soc. 1888, p. 373. de Nicéville, Butt. of India, iii. p. 29, pl. 26, figs. 157, 158, ♂ ♀ (1890). Manders, Trans. Ent. Soc. 1890, p. 527. Elwes, Proc. Zool. Soc. 1892, p. 619. Bingham, Fauna of Brit. India, Butt. ii. p. 298 (1907).

*Gerydus drumila*, Moore, Proc. Zool. Soc. 1883, p. 521, ♂ (ex errore).

IMAGO.—Male. Upperside of a dark earthy brown. *Forewing* with a pale curved patch from the end of the cell, sometimes connected with the base by an obscure pale streak through the cell; the outer portion blacker than the rest of the wing. *Hindwing* unmarked. Underside with all the markings darker brown with white edges.

\* P.Z.S. 1883, p. 521.

*Forewing* with the outer portion covered with many of these spots of various sizes, the lower discal portions with a few; cell with three elongated spots crossing it, a post-discal irregular band of detached spots, a sub-terminal lunular line. *Hindwing* with similar spots and minute dark brown specks; three basal detached spots in a transverse row, a medial macular band that crosses the cell, a large spot at apex of cell, with a similar spot above touching the costa, and another below it at base of interspace 3, a broad curved macular discal brown band, its upper spot well detached, the others confluent.

Female. Differs from the male in having a discal oblique band of three spots. Underside with the markings more clearly defined.

Expanse of wings, ♂ ♀  $2\frac{2}{10}$  inches.

**HABITAT.**—The Himalayas from Kumaon to Bhutan at low elevations, Assam and the Chittagong hill tracts (Bingham).

**DISTRIBUTION.**—Elwes records it from the Naga Hills, and Manders from the Shan States. We have received many examples of both sexes from the Khasia Hills.

#### ALLOTINUS SUBVIOLESCENS.

Plate 616, figs. 1, ♂, 1a, ♀, 1b, ♂.

*Allotinus subvioletescens*, Felder, Reise, Nov. Lep. ii. p. 280, pl. 35, figs. 27, 28 (1865). Bingham, Fauna of Brit. India, Butt. ii. p. 300 (1907).

*Allotinus alkamah*, Distant, Rhop. Malayana, p. 452, pl. 44, fig. 3, ♂ (1886). de Nicéville, Butt. of India, iii. p. 30 (1890).

**IMAGO.**—Male. *Forewing*. Upperside brownish-black, a dull violaceous patch consisting of two streaks divided by the vein, filling up the internomedian interspace from near the base, to the broad blackish outer border, a shorter streak fills up the interspace above in a similar manner. *Hindwing* blackish-brown, a broad medial dull violaceous streak from the base to the disc. Underside pale brownish-grey with a slight ochreous tint, with many transverse darker lines composed of specks, spots, and striæ, coalescing in parts.

Female. Upperside similar to the male, but the violaceous portion much larger, occupying most of the interior portion of the wing, leaving a broad costal and outer band. Underside like the male, but the markings more ochreous and prominent. Antennæ, head and body brown above, paler beneath, the palpi nearly white beneath.

Expanse of wings, ♂ ♀  $1\frac{5}{10}$  inches.

**HABITAT.**—Burma, Malay Archipelago.

**DISTRIBUTION.**—The type came from Java; Distant's type from Malayana; it is in the B. M. from Toungoo, Rangoon, Sumatra, Kina Balu, and Palawan. The male figure is from Felder's type-specimen from Tring Museum.

## ALLOTINUS NIVALIS.

Plate 616, figs. 2, ♂, 2a, ♀, 2b, ♂.

*Miletus nivalis*, Druce, Proc. Zool. Soc. 1873, p. 348.*Paragerydus nivalis*, Distant, Rhop. Malayana, p. 207, pl. 22, fig. 11, ♀ (1884).*Allotinus nivalis*, de Nicéville, Butt. of India, iii. p. 30, pl. 26, fig. 159, ♀ (1890). Elwes, Proc. Zool. Soc. 1892, p. 620. Bingham, Fauna of Brit. India, Butt. ii. p. 301 (1907).*Logania substrigosa*, Moore, Journ. As. Soc. Bengal, 1884, p. 22.

**IMAGO.**—Male. Upperside dark brown, unmarked. Underside white, with ochreous-brown markings. *Forewing* with some thickly dispersed specks on the costa, a post-discal thin transverse band, curving outwardly above and below its middle, the entire wing covered with minute specks and transverse strigæ. *Hindwing* similarly marked with strigæ, a sub-terminal series of black dots on both wings.

Female. Like the male above and below, except that the markings below are more pronounced and there is more or less suffusion on the outer borders of both wings, and a patch on the outer margin of the forewing below the apex.

Expanse of wings, ♂ ♀ 1 inch.

**HABITAT.**—Southern Burma, Malacca, Borneo, Sumatra, Nias.

**DISTRIBUTION.**—The type came from Borneo; Moore's type from the Mergui Archipelago; Elwes records it from Eastern Pegu, de Nicéville from Tenasserim and Mergui; it is in the B. M. from Sumatra and Nias.

## ALLOTINUS PANORMIS.

Plate 616, figs. 3, ♂, 3a, ♀, 3b, ♂, 3c, ♀.

*Allotinus panormis*, Elwes, Proc. Zool. Soc. 1892, p. 619, pl. 43, figs. 8, 9, ♂ ♀. Bingham, Fauna of Brit. India, Butt. ii. p. 301 (1907).

**IMAGO.**—Male. Upperside uniform dark brown with a slight pinkish-ochreous tinge. *Forewing* with a large pale, almost oval, longitudinal streak beyond the cell. *Hindwing* unmarked, cilia of both wings grey. Underside, greyish-white markings, ochreous-grey, both wings covered with innumerable minute strigæ, some forming small spots on the costa of the forewing, a spot in the cell, a bar beyond it, and another at its end; some larger transverse marks on the outer portion of the wing. On the hindwing there are a greater number of large marks on the basal half and a post-discal series of spots, on both wings there is a sub-terminal series of small spots.

Female. Like the male on the upperside, colour more ochreous-tinged, indications of the streak on the forewing; otherwise both wings are without markings. Underside

similar to the male, but the larger markings form irregular transverse dislocated bands on both wings. Antennæ brown, head and body dark brown, greyish-white beneath.

Expanse of wings, ♂  $1\frac{7}{10}$ , ♀  $1\frac{5}{10}$  inches.

HABITAT.—Karen and Naga Hills.

#### ALLOTINUS HORSFIELDI.

Plate 617, figs. 1, ♂, 1a, ♀, 1b, ♂, 1c, ♀.

*Miletus horsfieldi*, Moore, Cat. Lep. E.I.C. i. p. 19, pl. 1a, fig. 2, ♂ (1857). Druce, Proc. Zool. Soc. 1873, p. 347. Staudinger, Ex. Schmett. p. 269, pl. 94, ♂ (1888).

*Gerydus horsfieldi*, Butler, Trans. Linn. Soc. Zool. 1877, p. 546. Elwes, Proc. Zool. Soc. 1892, p. 618.

*Paragerydus horsfieldi*, Distant, Rhop. Malayana, p. 207 (woodcut of posterior leg), pl. 20, fig. 7, ♀ (1884). Doherty, Journ. As. Soc. Bengal, 1886, p. 131. de Nicéville, Butt. of India, iii. p. 26, pl. 26, fig. 156, ♂ (1890). Manders, Trans. Ent. Soc. 1896, p. 527. Watson, Journ. Bo. Nat. Hist. Soc. 1891, p. 43.

*Allotinus horsfieldi*, Bingham, Fauna of Brit. India, Butt. ii. p. 299 (1907).

#### Wet-season Brood.

IMAGO.—Male. Upperside uniform dark brown with the oval pale streak on the forewing much as in *panormis*, but somewhat shorter, both wings otherwise unmarked, cilia grey. Underside white, much whiter than in *panormis*, both wings entirely covered with very minute ochreous-grey strigæ, and sub-terminal blackish lunules; the forewing has some denser strigæ along the costa, two thin transverse bars in the cell and one at the end. The hindwing has some thicker marks along the costa and marks forming irregular and dislocated transverse bands, or indications of them, at the middle and on the disc.

Female. Like the male above, the longitudinal streak of the forewing very faintly indicated, on the underside the markings are similar, in some examples rather more pronounced. Antennæ brown, head and body brown above, white beneath.

Expanse of wings, ♂  $1\frac{7}{10}$  to ♀  $1\frac{5}{10}$  inches.

#### Dry-season Brood.

Male and female in no way differ from the Wet-season form, except in the smallness of its size and in the oval pale streak surrounding the swollen vein being smaller, obviously a little shorter, otherwise the markings above and below are identical.

Expanse of wings, ♂ ♀  $1\frac{2}{10}$  inches.

HABITAT.—Assam, Burma, Malay Peninsula.

DISTRIBUTION.—Recorded by Watson from Chin Lushai, by Manders from the Shan States, by Elwes from E. Pegu; it is in the B. M. from Burma, Malacca, Borneo and Sumatra; in our collection from the Salween Valley, Burma and Sarawak; and there are several examples of the Dry-season brood in the B. M. from Tilin Yaw and the Karen Hills.

#### ALLOTINUS TARAS.

Plate 617, figs. 2, ♂, 2a, ♀, 2b, ♂, 2c, ♀.

*Allotinus taras*, Doherty, Journ. As. Soc. Bengal, 1889, p. 437, pl. 23, fig. 10, ♂. Elwes, Proc. Zool. Soc. 1892, p. 619. Bingham, Fauna of Brit. India, Butt. ii. p. 300 (1907).  
*Paragerydus taras*, de Nicéville, Butt. of India, iii. p. 27 (1890).

IMAGO.—Male. *Forewing* longer and more acute than in *horsfieldi*, outer margin slightly curved. Upperside, both wings dark brown, the colour slightly darker at the apex of the forewing. Underside creamy-white, sparsely covered with brown strigæ unevenly distributed, a transverse macular discal band, composed of slender crescent-shaped markings, beyond which is a sub-marginal line of blackish dots. *Forewing* tinged with brown at the apex, the sub-apical dots within the brown area edged outwardly with white. *Hindwing* with a brownish marginal line.

Female. Paler than the male, otherwise it is similarly coloured and marked.

Expanse, ♂ ♀  $1\frac{3}{10}$  inches.

HABITAT.—Tenasserim and Chittagong.

#### INDO-MALAYAN ALLIED SPECIES.

*Allotinus fallax*, Felder, Reise, Nov. Lep. ii. p. 284, pl. 35, figs. 24, 25, 26 (1865). Habitat, Philippines.

*Allotinus major*, Felder, l.c. p. 286, pl. 35, figs. 29, 30, 31 (1865). *Synonyms*, *Allotinus albatus*, Felder, l.c. p. 287. Snellen, Tijd. voor Ent. 1878, p. 15. *Allotinus albatus*, var. *maximus*, Staudinger, Ex. Schmett. 1888, p. 269. Habitat, Celebes.

*Allotinus unicolor*, Felder, l.c. p. 369. Distant, Rhop. Malayana, p. 209 (1884). Habitat, Malay Peninsula.

*Allotinus apus*, de Nicéville, Journ. Bo. Nat. Hist. Soc. 1895 (vol. x.), p. 17, pl. 8, fig. 17, ♀. Habitat, N.E. Sumatra.

*Allotinus audax*, H. H. Druce, Proc. Zool. Soc. 1895, p. 564, pl. 31, figs. 11, ♂, 12, ♀. Habitat, Kina Balu, Borneo.

*Allotinus aphocha*, Kheil, Rhop. Nias, p. 28, pl. 5, fig. 30 (1884). *Paragerydus aphocha*, H. H. Druce, l.c. p. 563. Habitat, Nias, Borneo.

*Allotinus fabius*, *Paragerydus fabius*, Distant, Ann. Mag. Nat. Hist. 1887, p. 266. *Synonym*, *Allotinus caudatus*, Grose-Smith, Ann. Mag. Nat. Hist. 1893, p. 34. Habitat, Borneo, Celebes.

*Allotinus felderi*, Paragerydus felderii, Semper, Reise, Philipp. v. p. 163, pl. 31, fig. 22, ♀ (1889).  
Habitat, Philippines.

*Allotinus nigritus*, Paragerydus nigritus, Semper, l.c. p. 164, pl. 31, fig. 15 (1889). Habitat, Philippines.

*Allotinus punctatus*, Paragerydus punctatus, Semper, l.c. p. 165, pl. 31, fig. 16, ♂ (1889). Habitat, Philippines.

*Allotinus maccassarensis*, Paragerydus maccassarensis, Holland, Proc. Boston Soc. xxv. p. 70, pl. 4, fig. 5 (1891). Habitat, Celebes.

*Allotinus pixus*, Paragerydus pixus, de Nicéville, Journ. As. Soc. Bengal, 1894, p. 27, pl. 5, fig. 2, ♂.  
Habitat, Borneo.

*Allotinus portunus*, Paragerydus portunus, de Nicéville, l.c. fig. 14. Habitat, Java.

*Allotinus pætus*, Paragerydus pætus, de Nicéville, Journ. Bo. Nat. Hist. Soc. 1895, p. 269, pl. O, fig. 12, ♂. Habitat, N.E. Sumatra.

*Allotinus waterstradti*, Paragerydus waterstradti, H. H. Druce, Proc. Zool. Soc. 1895, p. 562, pl. 31, fig. 1, ♂. Var. *absens*, H. H. Druce, id. Habitat, Kina Balu.

*Allotinus melos*, Paragerydus melos, H. H. Druce, l.c. 1896, p. 652. Habitat, Cagayan Isl., N.E. of Borneo.

#### Genus LOGANIA.

*Logania*, Distant, Rhop. Malayana, p. 208 (1884). de Nicéville, Butt. of India, iii. p. 31 (1890).  
Bingham, Fauna of Brit. India, Butt. ii. p. 303 (1907).

*Malais*, Doherty, Journ. As. Soc. Bengal, 1889, p. 436.

*Forewing* sub-triangular, costa arched, apex angulate, but not produced, outer margin sinuous and somewhat dentate, strongly curved inwards above the lower angle which is obtuse; hinder margin nearly straight, somewhat shorter than the costa; costal nervure terminating near the middle of the costal margin; first sub-costal nervule emitted a little beyond the middle of the cell, second half way between that and the end of the cell, third and fourth forked at about two-thirds from the end. *Hindwing* long, the costa nearly straight, the outer margin deeply sinuate; first sub-costal nervule from a little before the end of the cell. *Palpi* long hirsute, apical joint slender, clothed with adpressed hairs. *Antennæ* with a gradually thickened club; *tibiae* incrassated; first joint of the tarsi cylindrical, and long as in *Allotinus*.

Type, *Logania malayica*, Distant, from the Malay Peninsula.

#### LOGANIA MARMORATA.

Plate 618, figs. 1, ♂, 1a, ♂.

*Logania marmorata*, Moore, Journ. As. Soc. Bengal, 1884, p. 22; id. Journ. Linn. Soc. Zool. 1886, p. 39, pl. 3, fig. 7. de Nicéville, Butt. of India, iii. p. 33, frontispiece, fig. 128 (1890).  
Manders, Trans. Ent. Soc. 1890, p. 527. Elwes, Proc. Zool. Soc. 1892, p. 620. Bingham, Fauna of Brit. India, Butt. ii. p. 303 (1907).

IMAGO.—Male. Upperside violaceous. *Forewing* with some grey irrorations at the base, costal band narrowly pale black, outer marginal band brownish-black, very broad, occupying one-third of the wing, its inner edge having some short blackish streaks running in on the veins. *Hindwing* with the costa very broadly blackish, the entire wing suffused with blackish-brown with the exception of a medial streak of the violaceous colour from the base to the disc. Underside whitish, heavily and irregularly mottled with dark brown. *Forewing* with the veins densely mottled and a dark sub-apical shade. *Hindwing* with obscure bands formed by the coalescing of the mottlings, sometimes medial, discal and sub-terminal, but they are not properly determinable, in some lights they appear to be longitudinal, sub-costal and medial.

Female, unknown.

Expanse of wings, ♂  $1\frac{9}{10}$  inch.

HABITAT.—Lower Burma.

DISTRIBUTION.—The type in the Indian Museum, Calcutta, came from Elphinstone Island, Mergui Archipelago; Manders records it from the Shan States, Elwes from Perak; there is an example in the B. M. from the Haundraw Valley, Burma.

#### LOGANIA WATSONIANA.

Plate 618, figs. 2, ♂, 2a, ♀, 2b, ♂, 2c, ♀.

*Logania watsoniana*, de Nicéville, Journ. Bo. Nat. Hist. Soc. 1898, p. 143, pl. Z, figs. 17, 18, ♂ ♀.  
Bingham, Fauna of Brit. India, Butt. ii. p. 303 (1907).

IMAGO.—Male. *Forewing*. Upperside white, the base irrorated with blackish atoms, a suffused blackish spot at the upper end of the cell, costal band narrowly blackish, apex broadly black, its inner margin crossing from the discoidal spot to vein 5, and then uniformly and less broadly to the hinder angle, the hinder margin also suffused with blackish. *Hindwing* entirely suffused, the costal margin broadly black. Underside. *Forewing* pale purplish-brown, an irregular white patch in the disc, continued to the hinder margin, some dark clouds in the purplish-brown portions and many striæ. *Hindwing* paler, the mottlings forming ante and post medial clouds.

Female. Upperside like the male, but the basal suffusion more extensive, leaving but a small white space in the upper disc. On the underside the ground colour of the hindwing is paler and more ochreous and sub-basal, ante-medial and post-medial macular bands are more or less observable. Antennæ, head and body blackish above and below.

Expanse of wings, ♂  $1\frac{1}{10}$ , ♀  $1\frac{2}{10}$  inches.

HABITAT.—Upper Burma.

DISTRIBUTION.—The type from the Shan States is in the Indian Museum, Calcutta. There are examples in the B. M. from the Shan States and Karen Hills.

#### LOGANIA MASSALIA.

Plate 618, figs. 3, ♂, 3a, ♀, 3b, ♂, 3c, ♀.

*Logania massalia*, Doherty, Journ. As. Soc. Bengal, 1891, p. 37, pl. 1, fig. 8, ♀. Elwes, Proc. Zool. Soc. 1892, p. 620. Bingham, Fauna of Brit. India, Butt. ii. p. 304 (1907).

IMAGO.—Male. Upperside dark brown. *Forewing*. A medial dull whitish spot at base of interspace 3 extending upwards on to vein 4 and below into interspace 2. *Hindwing* uniform, immaculate. Underside very pale dull brown, with darker brown mottlings and striae that on the forewing are absent on a broad streak from base outwards along the basal half of the dorsum, this area pale brown without markings; a dark obscure spot at apex of cell, and an incomplete similarly obscure dark transverse discal band. On the hindwing the mottlings coalesce and form three or four very ill-defined, obscure, transverse, somewhat broad bands. The antennæ in the only specimen of the male that I have seen are wanting; head, thorax and abdomen are dark brown. Sex mark, the base of vein 4 swollen and bare of scales (Bingham).

Female. Above black, a round, dull white discal area on the forewing from just above the upper median vein almost to the sub-median vein. Below, irregularly speckled and variegated; forewing with the costal and apical parts ochreous-brown, the rest blackish. Hindwing also tinged with ochreous, a sub-marginal dark area, and obscure dark transverse bands. Hindwing not angled, the margin entire (Doherty).

Expanse of wings, ♂ ♀  $1\frac{2}{5}$  inches.

HABITAT.—Margherita, Upper Assam.

We have not seen this species; the figure of the ♂ is from the type-specimen in coll. Bingham; and of the female, from Doherty's figure.

#### INDO-MALAYAN ALLIED SPECIES.

*Logania regina*, Miletus regina, Druce, Proc. Zool. Soc. 1873, p. 348, pl. 32, fig. 4. Habitat, Borneo.

*Logania malayica*, Distant, Rhop. Malayana, p. 208, pl. 22, fig. 21, ♀ (1884). Habitat, Malay Peninsula.

*Logania lahomius*, Miletus lahomius, Kheil, Rhop. Nias, p. 27, pl. 5, figs. 28, 29. Habitat, Nias.

*Logania obscurus*, Allotinus obscurus, Rober, Iris, 1885, p. 52, pl. 4, fig. 8. Habitat, Celebes.

*Logania sriwa*, Distant, Ann. Mag. Nat. Hist. 1886, p. 531; id. Rhop. Malayana, p. 452, pl. 44, fig. 16 (1884). Elwes, Proc. Zool. Soc. 1892, p. 620. Malais sriwa, Doherty, Journ. As. Soc. Bengal, 1889, p. 436. Habitat, Malay Peninsula.

*Logania distanti*, Staudinger, Lep. Palawan, p. 93, pl. 1, fig. 3, ♀ (1889). Semper, Reise, Philipp. p. 161, pl. 31, figs. 6, 7 and 21 (1889). *Logania obscura*, Distant and Pryer, Ann. Mag. Nat. Hist. 1887, p. 266 (nom. præoc.). Habitat, Philippines, Borneo.

*Logania luca*, de Nicéville, Journ. As. Soc. Bengal, 1895, p. 29, pl. 2, fig. 13, ♀. Habitat, Perak, Malay Peninsula, Sumatra.

*Logania staudingeri*, H. H. Druce, Proc. Zool. Soc. 1895, p. 565, pl. 31, figs. 13, ♂, 14, ♀. Habitat, Kina Balu.

### Sub-Family LYCÆNOPSISÆ.

#### Genus LYCÆNOPSIS.

*Lycænopsis*, Felder, Reise, Nov. Lep. ii. p. 257. Chapman, Proc. Zool. Soc. 1809, p. 419.

*Cyaniris*, Scudder (nec Dalman), ii. p. 918 (1872). Moore, Lep. Ceylon, i. p. 74 (1881). Distant, Rhop. Malayana, p. 210 (1884). de Nicéville, Butt. of India, iii., p. 92 (1890). Bingham, Fauna of Brit. India, Butt. ii. p. 315 (1907).

*Celastrina*, Tutt, Entom. xviii. p. 180 (1906).

*Notarthrinus*, Chapman, Proc. Zool. Soc. 1908, p. 677.

Eyes naked. Antennæ less than half the length of forewing, club long and spatulate; palpi sub-porrect, second joint pilose beneath, projecting half beyond the head, third joint naked, slender, and about half its length; body slender; legs slender; femora slightly pilose beneath. *Forewing* broad and short, costa slightly arched, apex rounded, outer margin convex, hinder angle slightly rounded, hinder margin nearly straight; cell half as long as the wing; vein 3 from before lower end of cell, 4 from the end, 6 from upper end, 6 and 7 closely approximate at base, upper discocellular therefore very short or absent, middle and lower very slender; vein 8 absent, 9 emitted from basal half of 7, 10 and 11 free, 12 bent towards 11, ends on costa a third before the apex. *Hindwing* with the costa slightly arched, apex and outer margin continuously rounded; cell half as long as the wing, middle discocellular shorter than the lower; veins 3 and 4 from lower end of cell.

Type, *haraldus*, Fabricius, from Sumatra.

We are obliged to put Chapman's genus as a synonym, because it is erected on the genitalia only, and for all practical purposes this is useless. The genus *Cyaniris* seems to have been here misplaced by many authors; Prout has called attention to the fact that Dalman gave *semiargus*, Rottenburg, as his type for *Cyaniris*, and *semiargus* does not belong to this genus; we must take *Lycænopsis*, Felder, for the genus, his type *haraldus* being congeneric with the Indian forms.

## SECTION I.—NOTARTHINUS.

Differs from *Lycænopsis* in each portion of the dorsal armature of the ancillary appendages having the separate-jointed spine (as in *Lycæna*). In *Lycænopsis* the spine, when there is one, is merely a chitinous process continuous with the base. (Chapman.)

## LYCÆNOPSIS VARDHANA.

Plate 619, figs. 1, ♂, 1a, ♀, 1b, ♀.

*Polyommatus vardhana*, Moore, Proc. Zool. Soc. 1874, p. 572, pl. 66, fig. 5, ♂.

*Cyaniris vardhana*, Moore, Proc. Zool. Soc. 1882, p. 244. Butler, id. 1886, p. 367; id. Ann. Mag. Nat. Hist. 1888, p. 147. de Nicéville, Butt. of India, iii. p. 95 (1890). Mackinnon and de Nicéville, Journ. Bo. Nat. Hist. Soc. 1898, p. 379. Butler, Ann. Mag. Nat. Hist. 1900, p. 442. Bingham, Fauna of Brit. India, Butt. ii. p. 318 (1907).

*Notarthrinus vardhana*, Chapman, Proc. Zool. Soc. 1909, p. 424 (text fig. of ancillary appendages).

IMAGO.—Male. Upperside pale iridescent blue. *Forewing* with the costa and outer margin broadly dusky black, the apical portion the broadest; some grey irrorations on the basal and lower portions of the wing; a black bar at the end of the cell, the space outside it palest, nearly white. *Hindwing* with the costa broadly pale blackish, a black bar at the end of the cell, a dusky, suffused, narrow, outer marginal band, the basal portion of the wing thickly irrorated with grey scales, the entire blue colouring of the wing darker than it is in the forewing. Underside dull milky white, some bright blue irrorations at base of forewing, and on the basal and abdominal portions of the hindwing. *Forewing* with two black spots at the end of the cell, sometimes touching each other; two smaller, well separated spots beyond, at about half distance to the apex of the wing, a row of three large post-discal spots in the three lowest interspaces. *Hindwing* with a number of black dots; two near the base, two close together below, near the abdominal margin, one sub-costal near the apex, two in the disc below, and two below these, on their inner side, in echelon.

Female like the male, but the white space on the forewing is much more extensive, and the dusky blackish edging to the hindwing broader, and some blackish, obscure spots on the outer margin.

Expanse of wings, ♂ ♀  $1\frac{6}{10}$  inches.

HABITAT.—N.W. Himalayas.

DISTRIBUTION.—Mackinnon records it from Mussuri, de Nicéville from Simla, Thundiani, Kumaun and Naini Tal; it is in the B. M. from Murree, Kangra and Kujiar.

## LYCÆNOPSIS BINGHAMI.

Plate 619, figs. 2, ♂, 2a, ♂.

*Notarthrinus binghami*, Chapman, Proc. Zool. Soc. 1908, p. 678, pl. 38, fig. 2 (Ancillary appendages); id. l.c. 1909, p. 424.

Agrees with de Nicéville's description of *Bothria chennellii*, except that it is without the discal line on the upperside of the forewing, and the sixth spot of the row on the underside is all but obsolete. A more important difference is that in this row of spots, the first one in *chennellii* is in line with the others, in *binghami* it is markedly moved inwards, as in *argiolus* and many other *Cyanirids*.

Type in Colonel Bingham's collection. A co-type in somewhat finer condition is in the Museum at Tring. Colonel Bingham's specimen is from Shillong. The Tring specimen is labelled "Khasia Hills, Assam" (Chapman).

Expanse of wings, ♂  $1\frac{2}{5}$  inches.

HABITAT.—Khasia Hills.

There is an example in our collection identified by Dr. Chapman, which we figure.

## LYCÆNOPSIS MUSINOIDES, nov.

Plate 619, figs. 3, ♂, 3a, ♀, 3b, ♂.

*Lycæna musina*, Bingham (nec Snellen), Fauna of Brit. India, Butt. ii. p. 328 (1907).

IMAGO.—Male. Upperside pale greyish-blue, costal line of forewing and outer marginal narrow bands of both wings brownish-black; the latter broadest at the apex of both wings, narrowing hindwards; cilia white. Underside greyish-white, markings pale brown. *Forewing* with a linear mark at the end of the cell; a post-discal series of transverse linear marks, somewhat in echelon, except the uppermost one, which is well inside the wing. *Hindwing* with a similar linear mark at the end of the cell; a recurved discal series of lunular marks; two sub-costal black spots, and a third below the first one; both wings with a sub-terminal lunular line and an anteciliary series of small spots, all the spots and marks edged with white; antennæ black ringed with white; head and body brownish-black above, whitish beneath.

Female. Upperside a little paler than the male, with blue reflections. *Forewing* with broad costal and outer blackish borders. *Hindwing* with some blackish suffusion on the basal area; a thin outer marginal blackish band; a sub-marginal series of whitish lunules, edged inwardly by a blackish line; the outer portion of all the veins blackish. Underside similar to the male.

Expanse of wings, ♂ ♀  $1\frac{1}{5}$  inches.

HABITAT.—Upper Burma.

DISTRIBUTION.—Types. N. Chin Hills in B. M., a male from Beeling, Tenasserim, and both sexes from Tilin Yaw. It is allied to *L. musina*, Snellen, from Java and Sumatra, but is much smaller and of an entirely different colour; there are five examples of typical *musina* from Sumatra in the B. M. which are identical with Snellen's type male, kindly lent me; de Nicéville wrongly identified *musina* in Journ. Bo. Nat. Hist. Soc. 1895, p. 275, pl. O, fig. 19; he was not sure of his identification, and on the following page suggested *caudales* as the name for his insect.

## SECTION II.—LYCÆNOPSIS.

Dorsal armature in two lateral portions, the actual dorsum being merely part of the chitinous ring of the ninth abdominal segment with no armature; the ventral, soft (that is unarmed with spicules or teeth), is nearly or quite obsolete (Chapman).

### LYCÆNOPSIS OREANA, nov.

Plate 619, figs. 4, ♂, 4a, ♂.

IMAGO.—Male. Upperside lilacine grey with a very strong violet flush, resembling *L. oreas*, Leech, from Central China, and to which it is closely allied, the genitalia being similar ( teste Chapman), but it differs from *oreas* on the upperside in the absence of the black costal broad area on the hindwing, having merely a thin black costal line in the forewing, and a very narrow and uniform outer marginal black band; on the hindwing there is no terminal band, merely a black terminal line; the cilia also is different, in *oreas* it is pure clear white, the forewing with black spots at the vein ends; in this form the cilia of the hindwing is intersected by a distinct basal grey line. Underside. *Forewing* with a grey line at the end of the cell; a post-discal linear row of four grey spots, a fifth spot of this series sub-costal and well inwards; a sub-terminal series of pale grey lunules; some spots close to the marginal line, which is black. *Hindwing* distinctly different from the markings in *oreas*, the same blue scales at the base, a dot near the costal fourth, another below it, the outer marginal markings as on the forewing, but the discal series of spots are quite differently placed to those in *oreas*, being nearer the margin, consisting of five in almost a line; between the first two from the base there is one nearer the margin, and the series is completed by a spot well inwards, followed by a dot on the costa a little forward.

Expanse of wings, ♂  $1\frac{9}{10}$  inches.

HABITAT.—Khasia Hills (Elwes), two examples.

## LYCÆNOPSIS TRANSPECTUS.

Plate 620, figs. 1, ♂, 1a, ♀, 1b, ♂ (Wet-season Brood), 1c, ♂, 1d, ♀ 1e, ♀ (Dry-season Brood).

*Polyommatus transpectus*, Moore, Proc. Zool. Soc. 1879, p. 139.

*Cyaniris transpectus*, de Nicéville, Journ. As. Soc. Bengal, 1883, p. 70, pl. i. figs. 6 ♂, 6a, ♀ ; id. Butt. of India, iii. p. 99, pl. 26, fig. 170 (Wet-season form), 171 ♂ (Dry-season form) (1890). Elwes, Proc. Zool. Soc. 1892, p. 622. Swinhoe, Trans. Ent. Soc. 1893, p. 290. Bingham, Fauna of Brit. India, Butt. ii. p. 322 (Woodcut ♀ fig.) pl. 19, fig. 126 ♂ (1907).

*Lycænopsis transpectus*, Chapman, Proc. Zool. Soc. 1909, p. 432.

*Cyaniris latimargo*, Moore, Proc. Zool. Soc. 1883, p. 523, pl. 48, fig. 9, ♂ ♀ ; de Nicéville, Butt. of India, iii. p. 100 (1890).

Wet-season Brood (= latimargo), Figs. 1, ♂, 1a, ♀, 1b, ♂.

IMAGO.—Male. Upperside dark lilacine blue. *Forewing*, costa with a thin black band; outer marginal band also black, deep at the apex, rather broad and even on the outer margin; a small lower discal white patch. *Hindwing* with a similarly broad and even black band on the outer margin, but this band is not always entire, sometimes it consists of a dentated thin band closely attached to a narrow marginal band. Underside greyish-white with a very faint blue tinge, markings brown. *Forewing* with a line at the end of the cell; a post-discal row of short lines more or less in echelon, the uppermost one more inwards than the others, a sub-terminal line of lunules, and an anteciliary row of black short linear marks. *Hindwing* with two black sub-basal spots; a linear mark at the end of the cell; a large black costal spot near the apex, being the uppermost end of an outwardly curved rather disjointed series of brown marks, the second from the margin more outwards than the others; a sub-terminal rather acutely dentated line, and an anteciliary row of black spots. Cilia grey on forewing, with white edgings on the hindwings.

Female. Upperside dark brownish-black; in some examples almost pure black. *Forewing* with a large white patch with suffused edges in the disc, nearly always extended hindwards to the lower margin in its middle, and often continued down the hindwing, sometimes to its centre; the apical and outer portions darker than the rest of the wings; cilia as in the male. Underside, like the male, but the markings more pronounced, and in some specimens the interior markings of the hindwing are all blackish.

Expanse of wings, ♂ ♀  $1\frac{2}{10}$  inches.

Dry-season Brood (Figs. 1c, ♂, 1d, ♀, 1e, ♀).

Male. Upperside of a paler colour than in the other form. *Forewing* without the costal black band, the outer marginal band similar, the white in the disc more

extensive. *Hindwing* with the outer marginal band narrower, and suffused hindwards, sometimes containing a whitish dentated line. Underside whiter, the markings similarly disposed, but faint and reduced.

Female. Upperside. *Forewing* brownish-black, the whole of the disc pure white, leaving a third of the base pale blackish; the costa and outer margins broadly black; a black streak at the end of the cell, touching the costal band. *Hindwing* with all the interior portion pure white; some blackish suffusion on the basal portion, and paler suffusion on the abdominal marginal space; a broad inwardly suffused pale blackish marginal band, containing a sub-marginal series of whitish lunules. Underside as in the male.

Expanse of wings, ♂ ♀  $1\frac{2}{10}$  inches.

HABITAT.—Sikkim, Assam, Burma.

DISTRIBUTION.—Recorded by Elwes from the Karen Hills; we have it from Sikkim, the Khasia Hills and Bhutan; and it is in the B. M. also from Tenasserim.

#### LYCÆNOPSIS PUSPA.

Plate 620, figs. 2, ♂, 2a, ♀, 2b, ♀: (Wet-season Brood), 2c, ♂, 2d, ♀, 2e, ♂ (Dry-season Brood).

*Polyommatus puspa*, Horsfield, Cat. Lep. E.I.C. p. 67 (1828).

*Cyaniris puspa*, Moore, Proc. Zool. Soc. 1882, p. 245. de Nicéville, Journ. As. Soc. Bengal, 1883, p. 67, pl. i. fig. 5a, ♀. Butler, Ann. Mag. Nat. Hist. 1885, p. 335. Hampson, Journ. As. Soc. Bengal, 1888, p. 336. de Nicéville, Butt. of India, iii. p. 100 (1890). Elwes, Proc. Zool. Soc. 1892, p. 622. Swinhoe, Trans. Ent. Soc. 1893, p. 294. Davidson, Bell and Aitken, Journ. Bo. Nat. Hist. Soc. 1896, p. 373 (life history). Watson, id. 1897, p. 658. Mackinnon and de Nicéville, id. 1898, p. 377. Aitken and Comber, id. 1903, p. 47. Bingham, Fauna of Brit. India, Butt. ii. p. 323, pl. 19, fig. 127, ♂ (1907).

*Lycæna puspa*, var. Felder, Verh. zool.-bot. Ges. Wien, xviii. p. 282 (1868).

*Lycaeopsis puspa*, Chapman, Proc. Zool. Soc. 1909, p. 437 (text fig. 71).

*Polyommatus lavendularis*, Moore, Ann. Mag. Nat. Hist. 1877, p. 341.

*Cyaniris lavendularis*, Moore, Lep. Ceylon, i. p. 75, pl. 34, figs. 6, 6a, ♂, 7, ♀ (1881).

*Cyaniris lambi*, Distant and Pryer, Ann. Mag. Nat. Hist. 1882, p. 266. Distant, Rhop. Malayana, p. 211, pl. 21, fig. 22, ♂ (1884).

Wet-season Brood (Figs. 2, ♂, 2a, ♀, 2b, ♀).

IMAGO.—Male. Upperside dark violaceous-blue, with brilliant reflections in certain lights. *Forewing* with the costal line black; a broad outer marginal black band, broadest at the apex. *Hindwing* with a very broad black costal band, continued in a somewhat narrower form on the outer margin, narrowing hindwards. Underside greyish-white, very slightly tinged with blue; markings pale brown. *Forewing* with a lunular mark at the end of the cell; a discal whorl of spots, the upper one nearly round and inwards, the others in a row, the third outwardly oblique, the fifth also

oblique and larger than the others. *Hindwing* with three sub-costal black spots, and a fourth below the second, and a fifth (the smallest) between the third and the lowest spot; a lunular mark at the end of the cell, and a discal whorl of small spots, the middle one outwardly oblique; both wings with a sub-terminal angulated line, a marginal blackish line, and between them a complete series of blackish spots.

Female. Upperside. *Forewing*, with a very broad black band commencing narrowly at the base, widening along the costal space, broadest on the apical portion, and again broadening hindwards and occupying the outer half of the lower marginal space, leaving but a small portion of the central space brilliant blue on its basal half, and white on the outer half, where it is somewhat produced in the disc; a black spot at the end of the cell touching the upper black band. *Hindwing* nearly all black, the black bands much broader than in the male; a sub-marginal series of white spots; the inner portion of the wing suffused with blackish, except for a small whitish portion in the upper disc. Underside as in the male, but the spots larger and more pronounced; cilia of both wings white, with black marks at the end of the veins. Antennæ black, ringed with white; head and body black above, white beneath.

Expanse of wings, ♂ ♀  $1\frac{4}{5}$  inches.

Dry-season Brood (Figs. 2c, ♂, 2d, ♀, 2e, ♂).

Male. Upperside paler blue, with a white patch in the upper disc of both wings, sometimes larger in the hind than in the forewing; the marginal black band narrower; the hindwing in some examples has the outer marginal band suffused, and contains a series of black spots. Underside with the markings similarly disposed, but paler and smaller.

Female. Upperside. *Forewing* with the black bands narrower, somewhat diffuse towards the hinder angle, consequently the white inner space is much larger, and the blue on the basal portion of it is less brilliant. *Hindwing* pale greyish-blue, a white smear on the upper disc; the costal band diffuse; no outer marginal band; a sub-marginal lunular grey line; a black marginal line, and between them a row of black spots, inwardly edged by whitish lunular marks. Underside as in the male.

Expanse of wings, ♂ ♀  $1\frac{4}{5}$  inches.

LARVA of the woodlouse form, but not flattened; the ridge being well defined. It looks smooth, but under a microscope is seen to be covered with short white hair. Its colour is green, with a pink, longitudinal band along the centre of the back, which gradually becomes narrower and disappears as it reaches the tail. The sides are also strongly suffused with pink, the colour of the young leaves of the Jamba (*Xylia dolabiformis*, Bentham), on which it generally feeds. It may be noted that it also feeds on *Cytista scariosa*.

PUPA short and stout, the thoracic and abdominal portions being about the same height. Its colour varies with its situation, but is generally a brownish-white, much mottled with darker brown, and with a darker band along the thorax, extending along the centre of the abdomen. It is smooth, and not covered with hair (Davidson, Bell and Aitken).

HABITAT.—India, Burma, Andamans, Ceylon, Malayana, Java.

DISTRIBUTION.—Hampson records it from the Nilgiris, Elwes from the Naga and Karen Hills, Betham from Pachmari, Central Provinces, Davidson from Karwar, Watson from the Chin Hills, Mackinnon from Mussuri, Aitken from Matheran; we have it also from Sikkim, Kulu, Andamans, and many examples from the Khasia and Jaintia Hills.

#### LYCÆNOPSIS LILACEA.

Plate 621, figs. 1, ♂, 1a, ♀, 1b, ♂.

*Cyaniris lilacea*, Hampson, Proc. Nilgiri, Nat. Hist. Soc. 1887, p. 14. Bingham, Fauna of Brit. India, Butt. ii. p. 324 (1907).

*Cyaniris puspa*, var. *lilacea*, Hampson, Journ. As. Soc. Bengal, 1888, p. 356.

*Cyaniris puspa*, de Nicéville (part), Butt. of India, iii. p. 100 (1890).

*Cyaniris crissa*, de Nicéville, Journ. As. Soc. Bengal, 1894, p. 31, pl. 2, fig. 12.

IMAGO.—Male. Upperside, shining purplish-blue. *Forewing* with the costal line black, and a narrow black marginal band, broadest at the apex, and gradually narrowing hindwards. *Hindwing* with a costal black band, which sometimes does not quite touch the costa; on the outer part of the wing, this band is carried round the apex, where it is somewhat thickened, and gradually narrows down to the anal angle; some sub-terminal black spots. Underside greyish-white, markings brown. *Forewing* with some dots on the costa beyond the middle; a rather thick linear mark at the end of the cell; a post-discal row of spots, curving from the costal fourth, with two spots, then in a line down the wing, the second spot of the line being outwardly oblique. *Hindwing* with a sub-basal small black spot and two larger ones near it, one sub-costal and the other below it, and another sub-costal black spot near the apex, and a smaller one immediately below it; a line at the end of the cell, and a discal row of markings much as in *C. puspa*, both wings with an angulated sub-terminal line, and a fine marginal black line; the first, third and last spot between them black on the hindwing; cilia black tipped with white. Antennæ black, ringed with white; head and body black above, white beneath.

Female. Upperside. *Forewing* with broad black outer borders, commencing narrowly at the base of the costa, widening outwards, round the apex and down the outer margin, broadest at the lower angle; the inner portions of the wing darkly suffused with pale blackish, with blue scales at the base, becoming paler outwards

until it becomes white at the outer portion, a black spot at the end of the cell, touching the costal band. *Hindwing* with a broad costal blackish band; some black anteciliary spots, inwardly edged with white; the inner portion of the wing suffused with greyish-blue, darkest at the base, and whitish at its outer portion; underside as in the male.

Expanse of wings, ♂ ♀  $1\frac{4}{10}$  inches.

HABITAT.—Nilgiri Hills.

There are two examples, male and female types in the B. M., and one male in our collection. de Nicéville's type from the same locality is in the Indian Museum, Calcutta.

#### LYCÆNOPSIS CYANESCENTS.

Plate 621, figs. 2 ♂, 2a, ♀.

*Cyaniris cyanescens*, de Nicéville, Butt. of India, iii. p. 103, Frontispiece, fig. 129, ♂ (1890).

Bingham, Fauna of Brit. India, Butt. ii. p. 326 (1907).

*Lycænopsis cyanescens*, Chapman, Proc. Zool. Soc. 1909, p. 438.

*Cyaniris prominens*, de Nicéville, l.c.

IMAGO.—Male. Upperside deep rich iridescent blue. *Forewing* with a black costal line and narrow outer marginal band. *Hindwing* with the costal space blackish, and a narrow marginal band, rather broader than it is on the forewing, all the veins rather prominent. Underside greyish-white markings, brown. *Forewing* with a thin lunular line at the end of the cell, and a post-discal series of short linear marks rather close to the outer margin; the third from the bottom, much outwards, being close to the sub-terminal line; the fourth much outwardly oblique, the sub-costal spot on the inside as usual. *Hindwing* with a lunular line at the end of the cell, the sub-basal spots and discal series as usual, but the spot at each end of the latter large and black, both wings with the usual terminal line and sub-terminal series of lunules and spots; on the forewing these spots are minute and indistinct; on the hindwing they are black, and the middle ones large and prominent. Cilia brown tipped with white; antennæ black ringed with white; head and body above blackish-brown covered with brilliant iridescent blue, below white.

Expanse of wings,  $1\frac{2}{10}$  inches.

The above description is from an example in coll. Bingham.

Female. Upperside, both wings blackish. *Forewing* with the disc whitish, glossed with brilliant iridescent blue in some lights; a distinct discocellular spot. *Hindwing* with the costa broadly blackish, the disc as in the forewing, a sub-marginal series of blackish oval spots, inwardly defined by a blue, then a distinct lunulated blackish line. Underside as in the male.

Expanse of wings,  $1\frac{1}{10}$  to  $1\frac{3}{10}$  inches (de Nicéville).

HABITAT.—Nicobar Islands.

We have not seen a female ; the types are in the Indian Museum, Calcutta.

Local race, *prominens*, nov. Female. Upperside. *Forewing* with the blue area more extensive. *Hindwing* with the marginal spots much larger and blacker. Underside. *Hindwing* with all the markings much larger and more prominent, especially the spot just beyond the middle of the costa, and the marginal round spots, which are inwardly defined by a distinct narrow lunulated fuscous line ; the discal spots arranged in a regular sinuous band.

Expanse,  $1\frac{3}{10}$  inches.

HABITAT.—Little Nicobars (de Nicéville).

#### LYCÆNOPSIS HUEGELII.

Plate 621, figs. 3, ♂, 3a, ♀, 3b, ♂ (Wet-season Brood), 3c, ♂, 3d, ♀ (Dry-season Brood).

*Cyaniris huegelii*, Moore, Proc. Zool. Soc. 1882, p. 244. de Nicéville, Butt. of India, iii. p. 107 (1890). Mackinnon and de Nicéville, Journ. Bo. Nat. Hist. Soc. 1898, p. 380. Bingham, Fauna of Brit. India, Butt. ii. p. 333, pl. 19, fig. 129, ♂ (1907).

*Lycænopsis huegelii*, Chapman, Proc. Zool. Soc. 1909, p. 444.

*Lycæna argiolus*, Kollar (nec Linnaeus), Hügel's Kaschmir, iv. (2), p. 423 (1848).

Wet-season Brood (Figs. 3, ♂, 3a, ♀, 3b, ♂).

IMAGO.—Male. Upperside dark purplish-blue ; a black costal line on the forewing and black outer marginal line on both wings ; cilia white, with slender black marks at the ends of the veins. Underside pearly bluish-white, markings pale brown. *Forewing* with a slender line at the end of the cell ; a discal row of indistinct spots in the inter-spaces 2 to 6. *Hindwing* with three sub-basal black spots, the upper one sub-costal, the second in the middle, and the third close to the middle of the abdominal margin, in a straight row ; a black sub-costal dot near the apex, another a little inwardly below it, a third much nearer the margin, in the middle of the disc, and one between it and the spot near the abdominal margin ; both wings with a sub-terminal band of lunules enclosing a complete row of small spots.

Female. Upperside much paler than the male and duller in colour. *Forewing* with rather broad, dull blackish costal and outer marginal band. *Hindwing* with a very broad costal band of the same colour ; marginal line blackish, some anteciliary black triangular spots ringed with whitish and edged inwardly by a blackish thin band. Underside as in the male.

Expanse of wings, ♂ ♀  $1\frac{6}{10}$  inches.

Dry-season Brood (Figs. 3c, ♂, 3d, ♀).

Male. Upperside greyish lilacine blue ; costal line of forewing and outer marginal line of both wings very finely black, cilia as in the Wet-season form. Underside also as in that form, the markings very minute and indistinct.

Female, like the Wet-season form female, above and below, but the ground colour of the wings above has a whitish-lilacine tint, and the marginal markings of the hindwing are much more prominent. Antennæ black, ringed with white; head and body brownish-black above, white beneath.

Expanse of wings, ♂ ♀  $1\frac{1}{2}$  inches.

HABITAT.—Western Himalayas.

DISTRIBUTION.—Recorded from Kashmir, Murri, Simla, Mussuri, and Naini Tal; we have it from Kulu, and it is in the B. M. from Kangra, Chumba, Mandi, Dana, and Dalhousie.

#### LYCÆNOPSIS CŒLESTINA.

Plate 622, figs. 1, ♂, 1a, ♀, 1b, ♂.

*Lycena celestina*, Kollar, Hügel's Kaschmir, iv. (2), p. 423 (1848).

*Cyaniris celestina*, Moore, Proc. Zool. Soc. 1882, p. 244. de Nicéville, Butt. of India, iii. p. 106 (1890). Mackinnon and de Nicéville, Journ. Bo. Nat. Hist. Soc. 1898, p. 379. Leslie and Evans, id. 1903, p. 673. Bingham, Fauna of Brit. India, Butt. ii. p. 332 (1907).

*Lycenopsis celestina*, Chapman, Proc. Zool. Soc. 1909, p. 444.

*Lycena kollaris*, Westwood, Gen. Diurn. Lep. ii. p. 491 (1848).

*Cyaniris kollaris*, Butler, Proc. Zool. Soc. 1886, p. 367; id. Ann. Mag. Nat. Hist. 1888, p. 148.

*Polyommatus kasmira*, Moore, Proc. Zool. Soc. 1865, p. 503, pl. 31, fig. 1, ♂; id. 1874, p. 272.

IMAGO.—Male. Upperside lilac-blue. *Forewing* with a black costal line, which thickens towards the apex; a narrow outer marginal black band which thins hindwards. *Hindwing* with a slender marginal black line. Underside pearly bluish-white; with blue basal irrations, markings black. *Forewing* with a pale linear mark at the end of the cell; a discal row of linear marks in interspaces 2 to 5, the mark in interspace 3 the longest, the row completed by an inward sub-costal spot. *Hindwing* with three sub-basal spots, the first sub-costal, the second below the middle, and the third close to the abdominal margin and more inwards; a discal row of spots, the upper one close to the costa a little beyond the middle, with a spot a little inwardly below it; four spots in the disc, in a curve, one outwardly below the last, another small spot close to it, and one close to the abdominal margin a little beyond the middle; both wings with sub-terminal greyish lunules; in many examples the markings are more or less obsolescent. Cilia white, with some blackish points at the ends of the veins on the forewing. Antennæ black, ringed with white; head and body above blackish, white beneath.

Female. Upperside paler and of a duller colour than the male. *Forewing* with a broad blackish costal band commencing narrowly at the base, gradually widening towards the apex and continued broadly on the outer margin. *Hindwing* with the costa broadly blackish, except on the costal edge, which is pale; a black terminal line with blackish lunules, inwardly edged with whitish. Underside as in the male.

Expanse of wings, ♂  $1\frac{3}{10}$ , ♀  $1\frac{2}{10}$  inches.

LARVA, when full grown sixth of an inch in length; of the usual Lycænid shape; coloration light green of the exact shade of young leaves; the very small head, placed upon a long neck, is intensely black and shining; the segments increase slightly in width to the fifth, then gradually decrease to the thirteenth; the whole surface is finely shagreened, but entirely without markings, except two dorsal lines of a pale bluish-green colour from the second to the tenth segment, slightly converging posteriorly; the colour of the ground between these lines slightly darker than the rest of the surface; a few colourless short lateral hairs; the segments slowly constricted; no mouth-like opening on the eleventh, or erectile organs on the twelfth segment. Feeds on *Prinsepia utilis*, Royle.

PUPA, '40 to '45 of an inch in length; of the usual Lycænid shape, pale brown, irregularly and obscurely spotted and blotched with darker brown, no regular markings whatever, the surface rough, with short colourless bristly hairs (de Nicéville).

Dr. A. Forel, of Geneva, has identified the ant which attends this species in Mussuri as *Acantholepis capensis*, Mayr, var. *lunaris*, Em. (Mackinnon and de Nicéville).

HABITAT.—Western Himalayas.

DISTRIBUTION.—Leslie and Evans record it from Chitral; it is in the B. M. from Kashmir, Simla, Naini Tal, Murri and Masuri; and in our collection from Thundiani, Kulu, and Pangi.

#### LYCÆNOPSIS SIKKIMA.

Plate 622, figs. 2, ♂, 2a, ♀, 2b, ♂ (Wet-season Brood), 2c, ♂, 2d, ♀ (Dry-season Brood).

*Cyaniris sikkima*, Moore, Proc. Zool. Soc. 1883, p. 524, pl. 48, fig. 11, ♂. de Nicéville, Butt. of India, iii. p. 105 (1890).

*Celastrina argiolus*, var. *sikkima*, Tutt, Brit. Lep. ix. p. 388, pl. 28 (1908). Chapman, Proc. Ent. Soc. 1908, p. lxxxi.

*Lycaeonympha argiolus*, var. *sikkima*, Chapman, Proc. Zool. Soc. 1909, p. 444.

*Cyaniris jyntearia*, Swinhoe, Trans. Ent. Soc. 1893, p. 294. Bingham (part), Fauna of Brit. India, Butt. ii. p. 331 (1907).

Wet-season Brood (Figs. 2, ♂, 2a, ♀, 2b, ♂).

IMAGO.—Male. Upperside dark dull purplish-blue. *Forewing* with a black spot at the end of the cell; a black costal line, a blackish, broad outer marginal band, broadest at the apex, but otherwise of uniform width. *Hindwing* with a black marginal line and black lunules. Underside greyish-white, markings grey. *Forewing* with a linear mark at the end of the cell, a post-discal regular row of outwardly oblique, short linear marks in interspaces 2 to 5, rather closer than usual to the margin, a spot also inwards near the costa. *Hindwing* with a linear mark at the end of the cell; three sub-basal small black spots, sub-costal, central, and one near the abdominal margin, a little inwards, a discal row of very small black dots, disposed as in *L. celestina*, both

wings with a sub-terminal lunulated line and a very fine marginal line, and between them a complete row of markings ; composed on the forewing of short grey lines, and on the hindwing of small blackish spots.

Female. Upperside like the male, but somewhat paler, in some examples with a little white suffusion in the upper disc of both wings. *Forewing* with broad costal and outer marginal black bands, commencing narrowly at the base of the costa, widening outwards, and broadest at the apex and hinder angle. *Hindwing* with a broad blackish costal band ; a narrow marginal band ; a sub-terminal blackish lunular line, and between them a row of whitish lunules. Underside as in the male, with the markings more prominent. Cilia white ; antennæ black, ringed with white ; head and body black above, white beneath.

Expanse of wings, ♂ ♀  $1\frac{3}{10}$  inches.

Dry-season Brood (Figs. 2c, ♂, 2d, ♀).

Male. Upperside much paler than the Wet-season form, and of a lilacine blue. *Forewing* with a large whitish patch in the middle ; a blackish costal line, and a black outer marginal band, nearly as broad as in the other form, often narrow hindwards, and becomes diffused at the hinder angle. *Hindwing* with a pale blackish suffused costal band, which becomes dark at the apex, where there is more or less of a patch ; a black marginal line, which is sometimes very thin, and has on its inner side a row of small black lunules, but in many examples this line is broad and covers the lunules. Underside as in the Wet-season form, the markings very small and slender.

Female, similar to the female of the Wet-season form, but the ground colour of both wings is nearly all white above ; the basal and lower portion of the forewing and the abdominal portion of the hindwing being suffused with blackish and covered with blue irrorations. Underside similar to the male.

Expanse of wings, ♂ ♀  $1\frac{2}{10}$  inches.

HABITAT.—Sikkim, Assam.

Bingham put this species as a synonym to *L. jynteana*, but Dr. Chapman has proved its distinctness by the examination of the genitalia ; we have received many examples from the Khasia Hills ; both the seasonal examples from which this description has been made have been examined and identified by Dr. Chapman as a form of *L. argiolus*, which *jynteana* is not.

LYCÆNOPSIS VICTORIA.

Plate 622, figs. 3, ♂, 3a, ♀, 3b, ♂.

*Cyaniris victoria*, Swinhoe, Trans. Ent. Soc. 1893, p. 293. Butler, Ann. Mag. Nat. Hist. 1900, p. 442. Bingham, Fauna of Brit. India, Butt. ii. p. 329 (1907).

*Lycænopsis victoria*, Chapman, Proc. Zool. Soc. 1909, p. 444.

IMAGO.—Male. Upperside pale grey-blue, whitish in the disc of both wings, the veins more or less prominent. *Forewing* with the costal line black, outer marginal band also black, but narrow, deepest at the apex, narrowing hindwards into a fine line at the hinder angle; a linear grey mark at the end of the cell. *Hindwing* with some dark suffusion on the costa; a sub-terminal, somewhat grey line and a black marginal line. Underside uniformly dark greyish-white, almost without any markings, a few scattered black minute dots indicating the usual markings.

Female. Upperside mostly white. *Forewing* with broad black borders; the base, inner half of the costal portion, and the lower two-thirds suffused with blackish; costal line black, broadening into a band from before the middle, broadest at the apex and narrower down the outer margin to the hinder angle, a black spot at the end of the cell, touching the costal band. *Hindwing* with the costal portion blackish, marginal line black, a sub-terminal line of grey lunules, and between them a series of black spots; the base and abdominal marginal portions suffused with blackish. Underside as in the male. Cilia of forewing blackish, edged with white, of the hindwing pure white; antennæ black, ringed with white; head and body blackish above, pale beneath.

Expanse of wings, ♂ ♀  $1\frac{1}{10}$  to  $1\frac{2}{10}$  inches.

HABITAT.—Khasia Hills.

Ten males and four females received by us from the Khasia Hills in one batch in 1893, never received since amongst the great number of butterflies we have had from the same collector.

#### LYCÆNOPSIS LANKA.

Plate 623, figs. 1, ♂, 1a, ♀, 1b, ♀.

*Polyommatus lanka*, Moore, Ann. Mag. Nat. Hist. 1877, p. 342.

*Cyaniris lanka*, Moore, Lep. Ceylon, i. p. 76, pl. 35, figs. 2, 2a, ♂ (1881). de Nicéville, Butt. of India, iii. p. 109 (1890). Manders, Journ. Bo. Nat. Hist. Soc. 1901, p. 78. Bingham, Fauna of Brit. India, Butt. ii. p. 330 (1907).

*Lycænopsis lanka*, Chapman, Proc. Zool. Soc. 1909, p. 456 (text fig. 96).

IMAGO.—Male. Upperside uniform dark purplish-blue; a very fine black marginal line on both wings, sometimes present, often absent. Underside shining greyish-white, marking grey, very indistinct. *Forewing* with a linear mark at the end of the cell; a post-discal series of linear markings in an almost straight line, rather nearer the margin than is usual. *Hindwing* with the usual three sub-basal black spots, almost in a straight line; the discal row of the usual pattern; both wings with sub-terminal grey lunular line, black terminal line and black spots between them, but the sub-terminal line is not always apparent.

Female, somewhat paler. *Forewing* with broad costal and outer marginal blackish bands. *Hindwing* with the costa broadly blackish; black subterminal spots and black marginal line. Underside as in the male, the markings a little more distinct. Cilia blackish, tipped with white. Antennæ black, ringed with white; head and body black above, white beneath.

Expanse of wings, ♂ ♀  $1\frac{2}{10}$  to  $1\frac{3}{10}$  inches.

HABITAT.—Ceylon.

#### LYCÆNOPSIS ALBIDISCA.

Plate 623, figs. 2, ♂, 2a, ♀, 2b, ♀.

*Cyaniris albidisca*, Moore, Proc. Zool. Soc. 1883, p. 524, pl. 48, fig. 7, ♂. Swinhoe, Proc. Zool. Soc. 1885, p. 133. Hampson, Journ. As. Soc. Bengal, 1888, p. 356. de Nicéville, Butt. of India, iii. p. 103 (1890). Watson, Journ. Bo. Nat. Hist. Soc. 1890, p. 33. Bingham, Fauna of Brit. India, Butt. ii. p. 325 (1907).

*Lycænopsis albidisca*, Chapman, Proc. Zool. Soc. 1909, p. 446 (text fig. 82).

IMAGO.—Male. Upperside dark indigo-blue. *Forewing* with two broad, short white streaks, divided by the vein, in the disc, obliquely placed; costal black line thick; outer marginal band very narrow; veins prominent. *Hindwing* with a longer white streak filling up the basal two-thirds of the interspace between veins 6 and 7, and consequently nearly triangular; a small white streak immediately below it; the veins prominent, the marginal band narrow with some black spots on it. Underside greyish-white, with a slight blue tint. *Forewing* with some small black marks on the costa towards the apex; a blackish line closing the cell; a post-discal series of black lunular marks, the first (hindwards) minute, the next three prominent, the third of these very oblique, the two upper ones small and in a curve inwards. *Hindwing* with the usual three sub-basal black spots in a line; the discal series as usual, but the middle mark linear and very oblique; both wings with an indistinct sub-terminal, grey, lunular line; a very fine marginal line, with markings between them, composed on the forewing of short grey linear marks, and on the hindwing of small black spots.

Female. Upperside mostly white. *Forewing* with a broad black costal and outer marginal continuous band of the usual shape; a black spot at the end of the cell, touching the costal band; the basal and lower portions of the wing suffused with blue irrations; the rest of the wing white. *Hindwing* with a broad blackish costal space; a narrow black marginal band containing a series of black spots with pale inner edges, bordered inwardly by a pale blackish lunular line. Underside as in the male; markings more pronounced. Antennæ black, ringed with white; head and body black above, white beneath.

Expanse of wings, ♀ ♂  $1\frac{6}{10}$  inches.

HABITAT.—Southern India.

DISTRIBUTION.—Recorded by Hampson from the Nilgiris, by Watson from Mysore; in our collection from Trevandrum, Poona, the Annamali and Pulni Hills, and in the B. M. also from Kolar.

#### LYCÆNOPSIS LIMBATA.

Plate 623, figs. 3, ♂, 3a, ♀, 3b, ♂.

*Polyommatus limbatus*, Moore, Proc. Zool. Soc. 1879, p. 139.

*Cyaniris limbatus*, Hampson, Journ. As. Soc. Bengal, 1888, p. 356. de Nicéville, Butt. of India, iii. p. 109 (1890). Davidson, Bell and Aitken, Journ. Bo. Nat. Hist. Soc. 1896, p. 373.

*Cyaniris limbata*, Watson, Journ. Bo. Nat. Hist. Soc. 1890, p. 33. Bingham, Fauna of Brit. India, Butt. ii. p. 329 (1907).

*Lycaenopsis limbata*, Chapman, Proc. Zool. Soc. 1909, p. 447 (text fig. 85).

IMAGO.—Male. Upperside dark purplish-blue; costal line of forewing and terminal line of both wings black. Underside greyish-white, with a slight blue tint; markings pale brown, much as in *L. puspa*, but smaller and more slender; the discal line of linear marks on the forewing more regular; the spot nearest the costa well inwards. *Hindwing* with the three sub-basal black spots as usual, but in a line with each other, and another black spot on the abdominal margin nearer the base; a linear mark at the end of the cell; the discal row of markings ending with a rather large black spot near the costa; both wings with a sub-terminal lunular line, a fine black marginal line, and between them a series of spots, the last three nearest the anal angle being black.

Female much paler, with some blue iridescence. *Forewing* with the costal band broad; the outer marginal band narrower. *Hindwing* with the costal and marginal bands broadly brownish-black in some examples, in others it is paler and diffused, and the outer margin contains a blackish sub-terminal lunular line, a black marginal line, and black spots between them. Underside as in the male. Antennæ black, ringed with white; head and body black above, greyish beneath; head and thorax clothed with long bluish hairs above.

Expanse of wings, ♂ ♀  $1\frac{2}{10}$  inches.

HABITAT.—Southern India, Behar, Bengal, Ceylon.

DISTRIBUTION.—Hampson records it from the Nilgiris, Watson from Mysore, Davidson from Karwar, de Nicéville from the Parisnath Hills and Travancore; we have it from Ceylon, Coorg, and Trevandrum.

#### LYCÆNOPSIS MARGINATA.

Plate 624, figs. 1, ♂, 1a, ♀, 1b, ♂ (Wet-season Brood), 1c, ♂, 1d, ♀, 1e, ♀ (Dry-season Brood).

*Cyaniris marginata*, de Nicéville, Journ. As. Soc. Bengal, 1883, p. 70, pl. i. fig. 9, ♂. Moore, Proc. Zool. Soc. 1883, p. 523, pl. 48, fig. 6, ♂. Doherty, Journ. As. Soc. Bengal, 1886, p. 134.

de Nicéville, Butt. of India, iii. p. 96 (1890); id. Journ. Bo. Nat. Hist. Soc. 1890, p. 297. Elwes, Proc. Zool. Soc. 1892, p. 622. Swinhoe, Trans. Ent. Soc. 1893, p. 293. Butler, Ann. Mag. Nat. Hist. 1900, p. 442. Bingham, Fauna of Brit. India, Butt. ii. p. 319 (1907).

*Lycaenopsis marginata*, Chapman, Proc. Zool. Soc. 1909, p. 447 (text fig. 83).

Wet-season Brood (Figs. 1  $\delta$ , 1a,  $\varphi$ , 1b,  $\delta$ ).

IMAGO.—Male. Upperside with broad costal and outer marginal bands on both wings. *Forewing* with a black spot at the end of the cell, touching the costal band; the inner area suffused with blackish with blue iridescence, except for two white streaks which fill up the two interspaces above vein 2, with a small white streak in the interspace above them; the lower streak sometimes is more or less suffused with blue on its outer part. *Hindwing* similarly coloured, with a white patch on its upper disc which varies in size. Underside greyish-white, with a slight bluish tint, markings brown, prominent; a lunule at end of cell, a row of post-discal spots close to the sub-terminal line, the second and third the largest, the third, fourth and fifth often joined together, the sixth inwards and near the costa. *Hindwing* with the usual three sub-basal black spots in a line, a fourth black spot near the abdominal margin nearer the base; a discal whorl of spots of the usual pattern, the first, third and sub-costal spots the largest; both wings with a sub-terminal angulated line; a black marginal line and a series of black spots between them. Cilia white, with minute brown marks. Antennæ black, ringed with white; head and body black above, white beneath.

Female, like the male, the blue iridescence less.

Expanse of wings,  $\delta$   $\varphi$   $1\frac{6}{10}$  to  $1\frac{7}{10}$  inches.

Dry-season Brood (Figs. 1c,  $\delta$ , 1d,  $\varphi$ , 1e,  $\varphi$ ).

Male. Upperside. *Forewing* like the Wet-season form, but the white area is much more extensive and the general coloration is paler, the blue iridescence more brilliant. *Hindwing* paler, the discal white patch larger, the marginal band replaced by a sub-terminal blackish lunular line, a black marginal line, enclosing a series of small blackish spots. Underside with the markings disposed as in the other form, but much smaller and faintly indicated.

Female, like the male above and below, but paler above, the white patch on the forewing occupying two-thirds of the inner space, the base and lower portions only being suffused with pale brownish and blue iridescence; on the hindwing above there is a black spot at the end of the cell; otherwise it is similar to the male.

Expanse of wings,  $\delta$   $\varphi$   $1\frac{3}{10}$  to  $1\frac{4}{10}$  inches.

HABITAT.—Himalayas, Upper Burma, Assam.

DISTRIBUTION.—Recorded by de Nicéville from Chin Lushai, Naini Tal, Kumaun, and Fort Stedman; by Elwes from the Karen Hills; in our collection from the Khasia Hills and from Sikkim; it is in the B. M. also from Nepal, Tilin Yaw and Thoungyon Valley.

## LYCÆNOPSIS PLACIDA.

Plate 624, figs. 2, ♂, 2a, ♀, 2b, ♂, 2c, ♀.

*Cyaniris placida*, de Nicéville, Journ. As. Soc. Bengal, 1883, p. 68, pl. i. fig. 8, ♂. Moore, Proc. Zool. Soc. 1883, p. 523, pl. 48, fig. 5, ♂. Butler, Ann. Mag. Nat. Hist. 1885, p. 334. Distant, Rhop. Malayana, p. 453, pl. 44, fig. 7, ♂ (1886). de Nicéville, Butt. of India, iii. p. 103 (1890). Manders, Trans. Ent. Soc. 1890, p. 527. Watson, Journ. Bo. Nat. Hist. Soc. 1891, p. 44. Elwes, Proc. Zool. Soc. 1892, p. 623. Swinhoe, Trans. Ent. Soc. 1893, p. 294. Bingham, Fauna of Brit. India, Butt. ii. p. 326 (1907).

*Lycænopsis placida*, Chapman, Proc. Zool. Soc. 1909, p. 447.

**IMAGO.**—Male. Upperside dark greyish-blue. *Forewing* with a black costal line, and black outer marginal band of disconnected linear marks. *Hindwing* with a blackish narrow costal space, and a marginal band of small triangular black spots; the terminal bands in some examples are broader than in others having the spots joined together. Underside dull greyish-white, markings pale brown. *Forewing* with a line at the end of the cell; a post-discal row of linear marks, the mark in the third interspace being oblique outwards, otherwise they are nearly in a line, the uppermost mark is on the inner side and well separated from the costa. *Hindwing* with the three usual black sub-basal spots in a line, the fourth spot on the abdominal margin nearer the base, but much closer than usual to the other abdominal marginal spot; a lunular line at the end of the cell; the usual discal row of spots, and both wings with sub-terminal lunular line and marginal black line, enclosing a series of spots, those on the hindwing being black and triangular.

Female. Upperside. *Forewing* nearly all brownish-black; the costal and outer blackish bands very broad; a black spot at the end of the cell touching the costal band; a large white patch in the disc; the rest of the wing suffused with blackish, with some blue reflections. *Hindwing*. Upperside with a very broad blackish costal band, filling up one-third of the wing; a narrow marginal black band, its inner side containing black triangular spots with white lunular inner edges and enclosed by a sub-terminal lunular blackish line; the rest of the wing, with the exception of a white discal patch, is suffused with blackish with blue reflections; the outer half of the veins black. Underside as in the male, but all the markings very large and prominent. Cilia grey, tipped with white. Antennæ black, ringed with white; head and body black above, whitish beneath.

Expanse of wings, ♂ 2  $\frac{4}{5}$  inches.

**HABITAT.**—Sikkim, Assam, Burma, Malay Peninsula.

**DISTRIBUTION.**—Manders records it from the Shan States, Watson from Chin Lushai and the Chin Hills, Elwes from the Naga Hills, de Nicéville from Sibsgar and Penang; it is in our collection from Sikkim, Pangi, Kulu, the Khasia Hills, and from Sinabong in Sumatra.

NOTE.—Some doubts have been stated as to the identification of the proper female of this species; the female herein described and figured was captured by Mr. Paul Möwis in Sikkim, and was sent to us with a number of males taken at the same time and place.

### LYCÆNOPSIS JYNTÉANA.

Plate 625, figs. 1, ♂, 1a, ♀, 1b, ♂.

*Cyaniris jyntéana*, de Nicéville, Journ. As. Soc. Bengal, 1883, p. 69, pl. 1, figs. 7, ♂, 7a, ♀. Moore, Proc. Zool. Soc. 1883, p. 524, pl. 48, fig. 10, ♂. de Nicéville, Butt of India, iii. p. 104 (1890). Manders, Trans. Ent. Soc. 1890, p. 528. Watson, Journ. Bo. Nat. Hist. Soc. 1891, p. 44. Elwes, Proc. Zool. Soc. 1892, p. 623. Watson, Journ. Bo. Nat. Hist. Soc. 1897, p. 659. Bingham (part), Fauna of Brit. India, Butt. ii. p. 331 (1907). Chapman, Proc. Ent. Soc. 1908, p. lxxxii.

*Lycænopsis jyntéana*, Chapman, Proc. Zool. Soc. 1909, p. 447.

IMAGO.—Male. Upperside, both wings deep lavender-blue. *Forewing* with the outer margin widest at the apex, sometimes reduced to a point at the hinder angle, dusky black; an indistinct discocellular streak sometimes absent; and the disc between the median nervules, just beyond the cell irrorated with white scales in some specimens. *Hindwing* with the outer margin dusky black, its inner edge lunulated. In some specimens the apical area is obscurely irrorated with white. Underside, both wings pale grey. *Forewing* with a pale brown discocellular streak, a discal series of five similar spots, of which the upper one is much out of line, being placed nearer the base of the wing; a sub-marginal lunulated line and marginal spots very pale brown; the usual fine anteciliary black line. *Hindwing* with three sub-basal black spots; a slender brown discocellular streak; a very sinuous discal series of nine spots; marginal markings as on the forewing.

Female. Upperside. *Forewing* with all but the middle of the disc (which is white, glossed with iridescent blue) black; a discocellular black spot. *Hindwing* blackish, white in the middle, glossed, with blue, and along the veins irrorated with black scales; a sub-marginal series of pale lunules. Underside, both wings marked exactly as in the male (de Nicéville).

Expanse of wings, ♂  $1\frac{4}{5}$  to  $1\frac{5}{6}$ , ♀  $1\frac{2}{6}$  to  $1\frac{2}{6}$  inches.

HABITAT.—Assam, Sikkim.

A rare species much resembling the Wet-season form of *S. sikkima*, but Dr. Chapman has shown that the genitalia is quite different, and that there is some slight constant difference in the fascies; the types came from the Jaintia Hills in Assam; we have received many thousands of Lycænids from that locality during the last twenty years, but do not appear to have ever received this species, as all our examples have been identified as *sikkima* by Dr. Chapman; we put the references above for what they are worth, most of them probably refer to *sikkima*.

## LYCÆNOPSIS DILECTA.

Plate 625, figs. 2, ♂, 2a, ♀, 2b, ♂ (Wet-season Brood), 2c, ♂; 2d, ♀ (Dry-season Brood).

*Polyommatus dilectus*, Moore, Proc. Zool. Soc. 1879, p. 139.

*Cyaniris dilectus*, de Nicéville, Journ. As. Soc. Bengal, 1883, p. 68, pl. i. fig. 5, ♂; id. Butt. of India, iii. p. 107 (1890). Elwes, Proc. Zool. Soc. 1892, p. 622. Swinhoe, Trans. Ent. Soc. 1893, p. 295. Watson, Journ. Bo. Nat. Hist. Soc. 1897, p. 659.

*Cyaniris dilecta*, Bingham, Fauna of Brit. India, Butt. ii. p. 331, pl. 19, fig. 128, ♂ (1907).

*Lycænopsis dilecta*, Chapman, Proc. Zool. Soc. 1909, p. 453 (text fig. 92).

Wet-season Brood (Figs. 2, ♂, 2a, ♀, 2b, ♂).

IMAGO.—Male. Upperside pale lilac-blue. *Forewing* with the middle of the wing somewhat pale; a very slender black, costal line; a slender black outer marginal line. *Hindwing* with the costal space narrowly suffused with grey, ending in a small blackish space at the apex; outer marginal black line also slender; in some examples there is a pale space in the upper disc of the wing. Underside whitish with a very faint bluish tint; markings pale brown, very slender, and hardly to be traced; on the forewing the sub-terminal series is uniformly in line; on the hindwing the discal series is in minute dots, and both wings have the cell markings and usual terminal markings faintly indicated.

Female. Upperside suffused with blackish with blue reflections. *Forewing* with broad costal and marginal blackish bands. *Hindwing* with some blue reflections at the base; a sub-terminal lunular blackish line and a black marginal line with black spots between them; the veins on both wings more or less prominent. Underside as in the male; the markings more distinct. Cilia white, marked with black. Antennæ black, ringed with white; head and body blackish-brown above, white beneath.

Expanse of wings, ♂ ♀  $1\frac{3}{6}$  to  $1\frac{4}{6}$  inches.

Dry-season Brood (Figs. 2c, ♂, 2d, ♀).

Male. Upperside of a brighter blue; a large white patch in the middle of the forewing, and a large discal patch on the hindwing, which is sometimes confined to the upper disc; the patch varies much in size, and sometimes extends across the wing; a slender black costal line on the forewing, and slender black marginal lines on both wings. Underside as in the Wet-season form.

Female. Upperside mostly white. *Forewing* with blue reflections, markedly so in the upper disc; costal and marginal black bands a little narrower than in the other form; a black spot at the end of the cell, touching the costal band; basal portion irrorated with pale blackish scales and some similar scales sparsely placed on the lower portion of the wing. *Hindwing*. Upperside nearly all white; some blackish suffusion

on the costal portion; a sub-terminal indistinct, grey lunular line; a black marginal line, with black spots between them; veins blackish and prominent. Underside as in the male.

Expanse of wings, ♂ ♀  $1\frac{2}{10}$  inches.

HABITAT.—Himalayas, Sikkim, Assam, Upper Burma, Arracan.

DISTRIBUTION.—Recorded by Elwes from the Naga Hills, by Watson from the Chin Hills, by de Nicéville from Nepal, Kumaon, North Cachar, and Sibsaghar; in our collection from Sikkim, Cashmir, and many examples of both sexes of both forms from the Khasia Hills.

#### LYCÆNOPSIS MELÆNA.

Plate 625, figs. 3, ♂, 3a, ♂.

*Cyaniris melæna*, Doherty, Journ. As. Soc. Bengal, 1889, p. 434, pl. 23, fig. 13, ♂. de Nicéville, Butt. of India, iii. p. 97 (1890). Elwes, Proc. Zool. Soc. 1892, p. 622. Butler, Ann. Mag. Nat. Hist. 1900, p. 443. Bingham, Fauna of Brit. India, Butt. ii. p. 320 (1907).

*Lycænopsis melæna*, Chapman, Proc. Zool. Soc. 1909, p. 464 (text fig. 108).

IMAGO.—Male. Upperside dull dark purple blue, iridescent in certain lights; the darkest species of the genus we have yet seen. *Forewing* with broad costal and outer marginal black borders, broadest at the apex. *Hindwing* with a broad blackish costal space; marginal band black; in the type-specimen apparently complete, but in other examples the band contains a series of lunular marks of the ground colour of the wing. Underside greyish-white with a blue tint; markings black. *Forewing* with a line at the end of the cell; a post-discal series of short lines, the second, fourth and fifth outwardly oblique, the fifth and sixth recurved inwards; a sub-terminal line of short blackish-brown lines; a terminal slightly sinuous black line; and between them some pale blackish spots. *Hindwing* with the spots more prominent; a line at the end of the cell; the usual three sub-basal spots; a row of discal spots disposed as usual, the centre one the largest and obliquely placed; a black terminal line; a sub-terminal angulated pale line; and between them a series of prominent black spots. Cilia black, tipped with white. Antennæ black, ringed with white; head and body black above with dark blue lines, greyish-white beneath.

Expanse of wings,  $1\frac{4}{10}$  inches.

Female, unknown.

HABITAT.—Tenasserim, Malay Peninsula.

There are three examples in our collection; it is not in the B. M.

#### LYCÆNOPSIS AKASA.

Plate 626, figs. 1, ♂, 1a, ♀, 1b, ♀.

*Polyommatus akasa*, Horsfield, Cat. Lep. E.I.C. p. 67, pl. 1, figs. 1, 1a, ♂ (1828).

*Cyaniris akasa*, Moore, Lep. Ceylon, i. p. 75, pl. 34, fig. 5, ♂ (1881). Hampson, Journ. As. Soc.

Bengal, 1888, p. 356. de Nicéville, Butt. of India, iii. p. 95 (1890). Watson, Journ. Bo. Nat. Hist. Soc. 1890, p. 34. Bingham, Fauna of Brit. India, Butt. ii. p. 318 (1907).

*Lycænopsis akasa*, Chapman, Proc. Zool. Soc. 1909, p. 458 (text fig. 100).

IMAGO.—Male. Upperside white. *Forewing* with the costal and outer marginal bands broadly black, broadest at the apex; the marginal band stopping abruptly before the hinder angle; the base of the wing suffused with blackish with blue iridescence which extends up the wing and covers the lower half of the costal band. *Hindwing* with base and two-thirds of the costal space suffused with blackish and blue iridescence; marginal line black, slender; a series of black dots on its inner side. Underside white, markings black. *Forewing* with a fine line at the end of the cell, a post-discal row of short linear marks in regular order, rather close to the margin, ending with an inner spot below the costa. *Hindwing* with the three sub-basal spots in a line, a discal, curved row of spots, commencing with a sub-costal spot a little beyond the middle, a dot below it; four spots in a curve in the middle of the wing, and two detached spots below the lowest spot; a sub-terminal row of spots and a slender terminal line.

Female, like the male, but without any blue reflections on the upperside. Cilia white. Antennæ black, ringed with white; head and body black above, white beneath.

Expanse of wings, ♂ ♀  $1\frac{2}{10}$  inches.

HABITAT.—Southern India, Ceylon, extending to Java.

DISTRIBUTION.—Recorded by Hampson from the Nilgiris, by Watson from Mysore, by de Nicéville from Shevaroy, Anamally and Pulni Hills; in our collection from North Canara, Trevandrum, Travancore, Madras, Kandy and Trincomali; in the B. M. Horsefield's type from Java, and others from the same locality.

#### LYCÆNOPSIS SINGALENSIS.

Plate 626, figs. 2, ♂, 2a, ♀, 2b, ♂.

*Lycaena singalensis*, Felder, Verh. zool.-bot. Ges. Wien, xviii. p. 282 (1868).

*Polyommatus singalensis*, Moore, Ann. Mag. Nat. Hist. 1877, p. 342.

*Cyaniris singalensis*, Moore, Lep. Ceylon, i. p. 76, pl. 35, figs. 1, 1a, ♂ (1881). de Nicéville, Butt. of India, iii. p. 108 (1890). Bingham, Fauna of Brit. India, ii. p. 333 (1907).

*Lycænopsis singalensis*, Chapman, Proc. Zool. Soc. 1909, p. 468 (text fig. 113).

IMAGO.—Male. Upperside purplish-blue; outer marginal line of both wings black. Underside greyish silvery-white with a very slight blue tint, markings brown. *Forewing* with a linear mark at the end of the cell; a post-discal row of short linear outwardly oblique marks, the lowest not oblique, all of them in an even row, ending in two small spots curving inwards below the costa. *Hindwing* with the three sub-costal black spots in a line, the fourth inner spot near the abdominal margin a mere dot, sometimes absent, a discal whorl of spots, the upper one and the two lower ones

blacker than the others, the detached spot before the last lower spot in the shape of a short curve ; both wings with a sub-terminal row of detached lunules ; a slender black marginal line and black dots between them.

Female. Upperside much paler than the male, with a lilac tinge in some examples, and brilliant blue reflections in some lights. *Forewing* with rather broad blackish costal and marginal bands ; a black spot at the end of the cell, touching the costal band. *Hindwing* with the costal portion suffused with pale blackish-brown, the base suffused with the same colour ; the upper disc pale, in some examples whitish ; a sub-terminal line of blackish lunules ; a marginal blackish line and blackish spots between them. Underside as in the male. Cilia white, black at its base. Antennæ black, ringed with white ; head and body black above, white beneath.

Expanse of wings, ♂ ♀  $1\frac{1}{2}$  inches.

HABITAT.—Ceylon.

DISTRIBUTION.—Occurs more or less throughout Ceylon ; Bingham records it from South India, but we have never seen an Indian example, nor can we find any record of one.

#### LYCÆNOPSIS ALBOCÆRULEA.

Plate 626, figs. 3, ♂ (one form), 3a, ♂ (another form), 3b, ♀, 3c, ♂, 3d, ♀.

*Polyommatus albocærulea*, Moore, Proc. Zool. Soc. 1879, p. 139.

*Cyaniris albocærulea*, de Nicéville, Journ. As. Soc. Bengal, 1883, p. 71, pl. i. figs. 4, ♂, 4a, ♀ ; id. Butt. of India, iii. p. 98 (1890). Elwes, Proc. Zool. Soc. 1892, p. 622. Swinhoe, Trans. Ent. Soc. 1893, p. 293. Mackinnon and de Nicéville, Journ. Bo. Nat. Hist. Soc. 1898, p. 379.

Butler, Ann. Mag. Nat. Hist. 1900, p. 443. Bingham, Fauna of Brit. India, Butt. ii. p. 321, pl. 19, fig. 125, ♀ (1907).

*Lycænopsis albocærulea*, Chapman, Proc. Zool. Soc. 1909, p. 470 (text fig. 116).

IMAGO.—Male. Upperside white. *Forewing* with the costa, outer margin and hinder border broadly pale lilacine-blue ; apex broadly black, narrowing hindwards on the outer margin, the base more or less suffused with blue, leaving the inner portion pure white. *Hindwing*, in some examples, pure white without markings, except a little grey and blue basal suffusion ; in others the blue suffusion extends a little along the costal and abdominal marginal portions of the wing and sometimes a little on the outer margin ; marginal line black. Underside pure white. *Forewing* with a very faint line at the end of the cell, and a post-discal row of black linear marks. *Hindwing* with many minute black spots in irregular order on the interior two-thirds of the wing, and sometimes, but not always, a series of sub-terminal black dots.

Female. Upperside like the male, but all the marginal bands are black without any blue, the blue reflections being confined to the basal portions of both wings.

*Hindwing* with the costa broadly blackish, some blackish suffusion at the base and along the abdominal margin, a black marginal line, a sub-terminal series of blackish spots, enclosed by an indistinct line of lunular marks. Underside as in the male, the markings more pronounced; the post-discal series of linear marks on the forewing slightly outwardly curved. Cilia of both sexes white. Antennæ black, ringed with white; head and body black above, white beneath.

Expanse of wings, ♂ ♀  $1\frac{4}{5}$  inches.

HABITAT.—Himalayas, Assam, Bhutan.

DISTRIBUTION.—Recorded by Elwes from the Naga Hills, by Butler from Sikkim and Bhutan, by Mackinnon from Mussuri, by de Nicéville from Dhera Dhun, Naini Tal, Khati, Kumaon and Nepal; it is in our collection from the Khasia Hills.

NOTE.—Bingham has figured the female, not the male.

#### INDO-MALAYAN AND CHINESE ALLIED GENERA AND SPECIES.

*Lycænopsis haraldus*, Papilio haraldus, Fabricius, Mant. Ins. ii. p. 82 (1787). *Synonyms*, *Lycænopsis ananga*, Felder, Reise, Nov. Lep. ii. p. 257, pl. 32, figs. 10, 11 (1865). *Cupido cornuta*, Druce, Proc. Zool. Soc. 1873, p. 349, pl. 32, fig. 5, ♀. Habitat, Malacca, Java, Sumatra, Borneo.

*Lycænopsis cagaya*, *Lycæna cagaya*, Felder, Reise, Nov. Lep. ii. p. 278, pl. 34, figs. 11 to 13 (1865). Habitat, Philippines.

*Lycænopsis ladonides*, *Lycæna ladonides*, de l'Orza, Lep. Japan, p. 20 (1869). Habitat, Japan.

*Lycænopsis duponchelii*, *Polyommatus duponchelii*, Godart, Enc. Méth. ix. p. 677 (1823). Habitat, Sumatra.

*Lycænopsis levetti*, *Cyaniris levetti*, Butler, Ann. Mag. Nat. Hist. 1883, p. 111. Habitat, Corea, Japan.

*Lycænopsis puspina*, *Plebeius puspina*, Kheil, Rhop. Nias, p. 30, pl. 5, figs. 37 to 39 (1884). Habitat, Nias.

*Lycænopsis kuhni*, *Cyaniris kuhni*, Rober, Iris, 1886, p. 60, pl. 4, fig. 29. Habitat, E. Celebes.

*Lycænopsis lambi*, *Cyaniris lambi*, Distant, Ann. Mag. Nat. Hist. 1887, p. 266. Habitat, Malay Peninsula.

*Lycænopsis philippina*, *Cyaniris philippina*, Semper, Reise, Philipp. v. p. 168, pl. 32, figs. 14, 16, ♂, 17, ♀, 15, 18, ♂, underside (1889). Habitat, Philippines.

*Lycænopsis nebulosa*, *Cyaniris nebulosa*, Leech, Entomologist, xxiii. p. 43 (1890). Habitat, Central China.

*Lycænopsis coalita*, *Cyaniris coalita*, de Nicéville, Journ. Bo. Nat. Hist. Soc. 1891, p. 363, pl. F, figs. 12, ♂, 13, ♀. Habitat, Java.

*Lycænopsis musina*, *Cyaniris musina*, Snellen, Tijd. voor Ent. xxxv. p. 145 (1892). *Notarthrinus musina*, Chapman, Proc. Zool. Soc. 1909, p. 424 (text fig. 53). Habitat, Java, Sumatra.

*Lycænopsis hersilia*, *Cyaniris hersilia*, Leech, Butt. of China, &c. ii. p. 319, pl. 31, fig. 16, ♀ (1892). Habitat, Central China.

*Lycænopsis oreas*, *Cyaniris oreas*, Leech, l.c. p. 321, pl. 31, figs. 12, ♂, 13, ♀. Habitat, Central China.

*Lycænopsis ceyx*, *Cyaniris ceyx*, de Nicéville, Journ. Bo. Nat. Hist. Soc. 1893, p. 326, pl. H, figs. 6, ♂, 7, ♀. Habitat, Java.

*Lycænopsis nedda*, Cyaniris nedda, Grose-Smith, Nov. Zool. i. p. 572 (1894). Habitat, Celebes.

*Lycænopsis cossæa*, Cyaniris cossæa, de Nicéville, Journ. Bo. Nat. Hist. Soc. 1895, p. 271, pl. O. figs. 14, ♂, 15, ♀. Habitat, N.E. Sumatra, W. Java.

*Lycænopsis corythus*, Cyaniris corythus, de Nicéville, l.c. p. 273, figs. 16, ♂, 17, ♀. Habitat, N.E. Sumatra.

*Lycænopsis carna*, Cyaniris carna, de Nicéville, l.c. p. 274, fig. 18, ♂. Habitat, N.E. Sumatra.

*Lycænopsis catreus*, Cyaniris catreus, de Nicéville, l.c. p. 276, figs. 20, ♂, 21, ♀. Habitat, Java.

*Lycænopsis camene*, Cyaniris camene, de Nicéville, l.c. p. 278, fig. 22, ♂. *Lycænopsis camene*, Chapman, Proc. Zool. Soc. 1909, p. 458 (text fig. 101). *Synonym*, Cyaniris selma, H. H. Druce, Proc. Zool. Soc. 1895, p. 573, pl. 32, fig. 10, ♂. Habitat, N.E. Sumatra, Kina Balu, Borneo.

*Lycænopsis candaules*, Cyaniris candaules, de Nicéville (nec *musina*, Snellen), l.c. p. 276, P.S. pl. O. fig. 19, ♂. Habitat, N.E. Sumatra.

*Lycænopsis lyce*, Cyaniris lyce, Grose-Smith, Nov. Zool. ii. p. 506 (1895). Habitat, S. Celebes.

*Lycænopsis dilectissima*, Cyaniris dilectissima, H. H. Druce, Proc. Zool. Soc. 1895, p. 571, pl. 32, figs. 2, ♂, 3, ♀. Habitat, Borneo.

*Lycænopsis placidula*, Cyaniris placidula, H. H. Druce, l.c. p. 572, figs. 6, ♂, 7, ♀. Habitat, Kina Balu, Borneo.

*Lycænopsis lugra*, Cyaniris lugra, H. H. Druce, l.c. p. 573, fig. 5, ♂. *Notarhrinus lugra*, Chapman, l.c. 1909, p. 427 (text fig. 55). Habitat, Kina Balu.

*Lycænopsis strophus*, Cyaniris strophus, H. H. Druce, l.c. fig. 4, ♂. Habitat, Kina Balu.

*Lycænopsis phuste*, Cyaniris phuste, H. H. Druce, l.c. pl. 34, fig. 17, ♂. Habitat, Dili, Sumatra.

*Lycænopsis planta*, Cyaniris planta, H. H. Druce, l.c. p. 574, pl. 32, fig. 8, ♂, 9, ♀. Habitat, Borneo.

*Lycænopsis ripte*, Cyaniris ripte, H. H. Druce, l.c. fig. 11, ♂. Habitat, Labuan, Borneo.

*Lycænopsis cara*, Cyaniris cara, de Nicéville, Journ. Bo. Nat. Hist. Soc. 1896, vol. xii. p. 143, pl. Z. figs. 19, ♂, 20, ♀. Habitat, South Celebes.

*Lycænopsis deliciosa*, Cupido deliciosa, Pagenstrekker, Ent. Nachr. xxii. p. 50 (1896); id. Abh. Senck. Ges. xxiii. p. 416, pl. 20, fig. 8 (1897). Habitat, Celebes.

*Lycænopsis sonchus*, Cyaniris sonchus, H. H. Druce, Proc. Zool. Soc. 1896, p. 655, pl. 29, fig. 4, ♂. Habitat, S.E. Borneo.

*Lycænopsis splendens*, Cyaniris splendens, Butler, Ann. Mag. Nat. Hist. 1900, p. 444. Habitat, Larut Hills, Perak.

*Lycænopsis imperatrix*, Cyaniris imperatrix, Butler, l.c. p. 444. Habitat, Siam.

*Lycænopsis shelfordi*, Cyaniris shelfordi, de Nicéville, Journ. Bo. Nat. Hist. Soc. 1902, p. 245, pl. FF. fig. 7, ♂. Habitat, Borneo.

*Lycænopsis owgarra*, Cyaniris owgarra, Bethune-Baker, Proc. Zool. Soc. 1908, p. 116, pl. 8, fig. 17. Habitat, Malay Peninsula.

*Artopœtes pryeri*, Lycæna pryeri, Murray, Ent. Mo. Mag. x. p. 126 (1873). Pryer, Rhop. Niphon. p. 18, pl. 5, fig. 16 (1886). *Artopœtes pryeri*, Chapman, Proc. Zool. Soc. 1909, p. 473 (text fig. 119). Habitat, Japan.

## Genus MEGISBA.

*Megisba* (with tails), Moore, Lep. Ceylon, i. p. 71 (1881). Distant, Rhop. Malayana, p. 457 (1886). de Nicéville, Butt. of India, iii. p. 60 (1890). Bingham, Fauna of Brit. India, Butt. ii. p. 313 (1907).

*Pathalia* (without tails), Moore, Journ. As. Soc. Bengal, 1884, p. 21.

Eyes naked, antennæ long, more than half the length of the forewing, stout, club spatulate and abrupt, palpi sub-porrect, third joint a little longer than the second, longer in the female. *Forewing* somewhat triangular; costa more arched in the female than in the male, apex somewhat angulate in the male, rounded in the female; outer margin convex, lower angle a little rounded, hinder margin slightly sinuous; cell half the length of the wing; vein 7 terminates on costa before the apex, 8 absent, 9 from the middle of 7; 10 and 11 free, 12 short, ending on costa before end of cell. *Hindwing* with vein 1a very short, 3 and 4 approximate from lower end of cell; sometimes with a slender tail, sometimes without, this difference occurring often in otherwise identical forms captured at the same time and place.

Type, *M. thuaitesi*, Moore.

#### MEGISBA MALAYA.

Plate 627, figs. 1, ♂, 1a, ♀, 1b, ♂ (Wet-season Brood), 1c, ♂, 1d, ♀ (Dry-season Brood), 1e (larva and pupa).

*Lycæna malaya*, Horsfield, Cat. Lep. E.I.C. p. 70 (1828).

*Lampides malaya*, de Nicéville, Journ. As. Soc. Bengal, 1881, p. 58. Wood-Mason and de Nicéville, id. p. 249.

*Pathalia malaya*, Moore, Journ. As. Soc. Bengal, 1884, p. 22. Doherty, id. 1886, p. 134. Wood-Mason and de Nicéville, id. p. 108.

*Megisba malaya*, Elwes, Trans. Ent. Soc. 1888, p. 375, pl. 11, fig. 1, ♂. de Nicéville, Butt. of India, iii. p. 61, pl. 26, fig. 165, ♂ (1890). Watson, Journ. Bo. Nat. Hist. Soc. 1891, p. 44. Elwes, Proc. Zool. Soc. 1892, p. 621. Swinhoe, Trans. Ent. Soc. 1893, p. 292. Davidson, Bell and Aitken, Journ. Bo. Nat. Hist. Soc. 1896, p. 373. Mackinnon and de Nicéville, id. 1898, p. 379. Bingham, Fauna of Brit. India, Butt. ii. p. 313 (1907).

*Megisba thuaitesi*, Moore, Lep. Ceylon, i. p. 71, pl. 34, fig. 3, 3a (imago), 3b (larva and pupa) (1881). de Nicéville, Journ. As. Soc. Bengal, 1885, p. 46. Distant, Rhop. Malayana, p. 457, pl. 44, fig. 4 (1886). Hampson, Journ. As. Soc. Bengal, 1888, p. 356.

*Pathalia sikkima*, Moore, Journ. As. Soc. Bengal, 1884, p. 21.

*Pathalia albidisca*, Moore, l.c.

*Megisba gunja*, Swinhoe, Proc. Zool. Soc. 1885, p. 133, pl. 19, fig. 7.

#### Wet-season Brood (Figs. 1, ♂, 1a, ♀, 1b, ♂).

IMAGO. — Male. Upperside dark brownish-black; some specimens without markings, but generally there is a medial small pale patch on the forewing; on the hindwing there is a very slender short tail at the end of vein 1, sometimes absent. Underside dull white. *Forewing* with basal, costal and outer marginal spaces suffused slightly with brown, some brown spots on the costa, a brown line closing the cell, a post-discal series of brown lunules, a sub-marginal sinuous brown line and a marginal line, including a series of brown spots. *Hindwing* with two rather large black spots near the base and a small one below them, another near the apex of the wing, a line

closing the cell, a discal band of brown spots very irregular and disjointed, the terminal markings as on the forewing.

Female like the male, but the forewing has generally a large white patch in the disc, which often extends hindwards to near the hinder margin. Cilia white, brownish towards apex of forewing in both sexes.

Expanse of wings, ♂ ♀ 1 inch.

Dry-season Brood (Figs. 1c, ♂, 1d, ♀).

Male and female like the Wet-season brood, but the medial patch is white, generally runs down from vein 4 to the hinder margin, broadening hindwards, and sometimes is continued a little on the hindwing; in the female this patch is much broader than in the male, and is nearly always continued on the hindwing till it meets the cell; the underside is also similar, but all the markings are larger and coarser. Antennæ, head, thorax and abdomen dark brown, beneath the antennæ are ringed with white, the palpi, thorax and abdomen pure white, the third joint of the palpi brown.

Expanse of wings, ♂ ♀ 1 inch.

LARVA.—Light green, vermiform, middle segments swollen.

PUPA.—Thick, blunt at the ends. Feeds on Sapindacæ (Moore).

HABITAT.—India, Andamans, Ceylon and the Malay Peninsula.

DISTRIBUTION.—Recorded by Hampson from the Nilgiris, by Watson from the Chin Hills, by Elwes from the Naga and Karen Hills, by Mackinnon from Mussoorie, by Davidson from Karwar; in our collection from the Nicobars, Sikkim, the Khasia Hills and Ceylon, some of the Ceylon examples of the Wet-season brood are very small, one of them measures only six-tenths of an inch; it is in the B. M. also from Ganjam, Belgaum, Poona, Andamans, Java, Sumatra and Borneo.

Genus NEOPITHECOPS.

*Neopithecops*, Distant, Rhop. Malayana, p. 209 (1884). de Nicéville, Butt. of India, iii. p. 51 (1890).

Bingham, Fauna of Brit. India, Butt. ii. p. 309 (1907).

*Pithecopa*, Moore (nec Horsfield), Lep. Ceylon, i. p. 72 (1881).

*Parapithecopa*, Moore, Journ. As. Soc. Bengal, 1884, p. 20.

Eyes naked; antennæ more than half the length of the costa of forewing; club well formed, long and excavated on the inner side; palpi porrect, third joint stout and blunt at apex in the male, cylindrical in the female. Forewing with the costa arched, the wing broader proportionately than it is in *Pithecopa*, less rounded at the apex, outer margin convex, lower angle well marked, hinder margin straight; the costal nervure terminates before the end of the cell; the first sub-costal nervule just

beyond its end; the base of the second sub-costal is rather nearer to the base of the first than to that of the upper discoidal; the third sub-costal is emitted about midway between the base of the upper discoidal and the apex of the wing; cell more than half the length of the wing. *Hindwing* not so narrow proportionately as it is in *Pithecopis*, cell considerably longer.

Type, *N. horsfieldi*, Distant.

#### NEOPITHECOPS ZALMORA.

Plate 627, figs 2, ♂, 2a, ♀, 2b, ♂ (Wet-season Brood), 2c, ♂, 2d, ♀ (Dry-season Brood), 2e, ♂ (Extreme Dry-season Brood).

*Pithecopis zalmora*, Butler, Cat. Fabr. Lep. p. 161 (1869). Moore, Proc. Zool. Soc. 1882, p. 244. Doherty, Journ. As. Soc. Bengal, 1886, p. 134.

*Neopithecopis zalmora*, de Nicéville, Journ. As. Soc. Bengal, 1883, p. 46. Hampson, id. 1888, p. 356. de Nicéville, Butt. of India, iii. p. 53, pl. 26, fig. 162, ♀ (1890). Watson, Journ. Bo. Nat. Hist. Soc. 1891, p. 43. Elwes, Proc. Zool. Soc. 1892, p. 621. Swinhoe, Trans. Ent. Soc. 1893, p. 292. Davidson, Bell and Aitken, Journ. Bo. Nat. Hist. Soc. 1896, p. 372 (life history). Watson, id. 1897, p. 658. Bingham, Fauna of Brit. India, Butt. ii. p. 309 (1907).

*Lycæna hylax*, Doubleday and Hewitson (nec Fabricius), Gen. Diurn. Lep. ii. p. 496, pl. 76, fig. 8 (1852).

*Pithecopis hylax*, Moore (nec Fabricius), Proc. Zool. Soc. 1877, p. 587.

*Pithecopis dharma*, Moore, Lep. Ceylon, i. p. 72, pl. 34, fig. 4, ♂ (1881).

*Pithecopis gaura*, Moore, Journ. As. Soc. Bengal, 1884, p. 20.

*Neopithecopis horsfieldi*, Distant, Rhop. Malayana, p. 210, pl. 22, fig. 15, ♂ (1884).

#### Wet-season Brood (Figs. 2, ♂, 2a, ♀, 2b, ♂).

IMAGO.—Male. Upperside black, sometimes without any white on the wings; in some specimens, however, there is a pale spot in the disc of the forewing, and in some this is white; the hindwings are usually without markings. Female, similar to the males, but in many examples there is a small whitish patch in the disc of both wings. Underside of both sexes white. *Forewing* with the apex dusky brown, the ends of veins 10, 11 and 12 with minute black dots, a slender brown line closing the cell, a post-discal, transverse series of brown lunules, sub-terminal and terminal very slender brown lines including a row of black lunules. *Hindwing* with a brown line on the discocellulars as in the male, a sub-costal black spot beyond the middle, another smaller one near the abdominal margin, also beyond the middle which form the ends of a post-discal, curved and sinuous brown line, the sub-terminal and terminal markings as in the forewing; in the female there are two and sometimes three sub-basal black spots in a line. Cilia of forewing dusky, of hindwing pure white.

Expanse of wings, ♂ ♀ 1 inch.

## Dry-season Brood (Figs. 2e, ♂, 2d, ♀).

Male. *Forewing.* Upperside with the interior portion white, leaving a broad costal and marginal black band, a black spot at the upper end of cell, and some brown suffusion at the base. *Hindwing* paler and more brownish ; a large white discal patch, which narrows somewhat upwards to vein 6, and often runs in towards the base above vein 4 ; a complete and well defined blackish-brown, rather narrow marginal band. Underside as in the Wet-season brood, but the lines and markings much paler and fainter.

Female, like the male, but the white on both wings more extensive.

Expanse of wings, ♂ ♀ 1 inch.

## Extreme Dry-season Brood (Fig. 2e, ♂).

Male and female like minute forms of the Dry-season brood, the markings underneath almost invisible.

Expanse of wings, ♂ ♀  $\frac{6}{10}$  to  $\frac{7}{10}$  inch.

LARVA of the usual woodlouse form, it is of a rough texture, with the segments well defined, pubose under the lens, the head concealed and the sides flattened ; colour a bright apple-green, with a faint darker line along the middle of the back ; it feeds on *Glycomis pentaphylla*, Correa, and the pupa is attached to the leaf, parallel to it ; the thoracic part is narrow and contracted, and the abdominal rounded and considerably higher than the thorax ; it is of a bright green with a darker dorsal line and a similar line forming the boundary of the abdominal segments ; it has a row of minute dark spots along these lines (Davidson, Bell and Aitken).

HABITAT.—India, Burma, Ceylon, Andamans, Malay Peninsula ; a common species.

## SECTION III.

## Genus PITHECOPS.

*Pithecopa*, Horsfield, Cat. Lep. E.I.C. p. 66 (1828). de Nicéville, Butt. of India, iii. p. 48 (1890). Bingham, Fauna of Brit. India, Butt. ii. p. 307 (1907).

Eyes naked ; antennæ a little longer than half the length of costa of forewing with a well formed spatulate club ; palpi sub-porrect ; second joint thickly clothed with adpressed scales ; third joint aciculate. *Forewing* long, narrow ; costa arched, apex rounded, hinder margin straight or very slightly sinuous ; cell about half the length of the wing ; the costal nervure short, terminating before the end of the cell, first sub-costal nervule emitted at about the middle of the cell, very short, directed obliquely upwards to the costal nervure, with which it is completely anastomosed in its

entire length, except for a short portion of the base; second sub-costal, long, emitted nearer the base of the first than to the base of the upper discoidal nervule; third sub-costal very short, emitted from the costal nervure at about opposite the apex of the second sub-costal; upper discocellular nervule absent; middle and lower discocellulars of about equal length, concave; lower discoidal nervule from the point of junction of the discocellulars; second median nervule emitted some little distance before the lower end of the cell; sub-median nervure sinuous, following the shape of the inner margin. *Hindwing* long, oval; costa very straight, outer and abdominal margin with an even curve; costal nervure slightly arched at base, then straight to the apex of the wing; first sub-costal nervule emitted much before the end of the cell; upper discocellular nervule short, outwardly oblique, straight; lower discocellular longer, upright, concave; second median nervule emitted a little before lower end of cell.

Type, *P. hylax*, Fabricius.

#### PITHECOPS HYLAX.

Plate 628, figs. 1, ♂, 1a, ♀, 1b, ♀.

*Papilio hylax*, Fabricius, Syst. Ent. p. 526 (1775); id. Sp. Ins. ii. p. 124 (1781); id. Mant. Ins. ii. p. 77 (1787).

*Hesperia Rurales hylax*, Fabricius, Ent. Syst. iii. (i) p. 304 (1793).

*Polyommatus hylax*, Godart, Enc. Méth. ix. p. 701 (1823).

*Pithecopa hylax*, Horsfield, Cat. Lep. E.I.C. p. 66, pl. 1, fig. 2, 2a (imago), 2b, pupa (1828). Moore, Proc. Zool. Soc. 1865, p. 771. Butler, Cat. Fabr. Lep. p. 161 (1869). de Nicéville, Journ. As. Soc. Bengal, 1882, p. 62; id. Butt. of India, iii. p. 49, pl. 26, fig. 161 (1890). Manders, Trans. Ent. Soc. 1890, p. 527. de Nicéville, Journ. Bo. Nat. Hist. Soc. 1890, p. 297. Watson, id. 1891, p. 43. Elwes, Proc. Zool. Soc. 1892, p. 621. Bingham, Fauna of Brit. India, Butt. ii. p. 308 (1907).

*Lycena hylax*, Hopffer, Stett. Ent. Zeit. xxxv. p. 27 (1874). Staudinger, Ex. Schmett. p. 271, pl. 94, ♂ (1888).

IMAGO.—Male. Upperside of a uniform brownish-black colour, without markings. Underside, milk-white, markings chocolate-brown. *Forewing* with a post-discal series of transverse short lines, the upper one the darkest, and two black sub-costal spots in continuation; a well marked band on the outer margin containing a series of similar lines all white. *Hindwing* with a post-discal paler line, a sub-terminal continuous line and a series of black dots close to the margin; a very large black spot at the apex of the wing. Cilia of forewing brown, of hindwing white.

Female, like the male, but there is a large white patch on the forewing above, a little below the centre of the wing, which varies in size in many examples.

Expanse of wings, ♂ 1, ♀  $\frac{9}{10}$  inch.

HABITAT.—Sikkim, Assam, Burma and the Malayan sub-region.

DISTRIBUTION.—Recorded by Manders from the Shan States, by Watson from the Chin Hills, by Elwes from the Naga Hills, by de Nicéville from Chittagong, Arakan, Burma; it is in our collection from Aru Island and Java; in the B. M. also from Sikkim, Tilin Yaw, Borneo, Nias, Java and Sumatra.

#### PITHECOPS FULGENS.

Plate 628, figs. 2, ♂, 2a, ♂.

*Pithecopa fulgens*, Doherty, Journ. As. Soc. Bengal, 1889, p. 127, pl. 10, fig. 6. de Nicéville, Butt. of India, iii. p. 50 (1890). Elwes, Proc. Zool. Soc. 1892, p. 621. Bingham, Fauna of Brit. India, Butt. ii. p. 308 (1907).

IMAGO.—Male. Upperside. *Forewing* with the discoidal cell, the internomedian interspace and the disc of the lower discoidal interspace resplendent cyaneous blue in some lights, dull violet in others, the black border wide, extending one-third towards the base. *Hindwing* similarly blue from the lower sub-costal nervule to the sub-median nervure, the black border somewhat narrower, especially towards the anal angle; cilia of the hindwing whitish, except at the ends of the veins. Underside, both wings pure white, a very slender dark marginal line, a narrow sub-marginal dark band, containing a line of six minute, dark, transverse streaks in the forewing, and five (usually six) in the hindwing, within which is a narrow transverse ochreous-brown fascia very closely defined (in the hindwing by an obscure dark line on its inner border) extending across the whole breadth of the forewing, and on the hindwing from the first sub-costal nervule to the sub-median nervure; traces of slender discal streaks on the forewing near the lower angle within the ochreous band. *Forewing* with the apex obscured with black scales (two small costal black spots). *Hindwing* with a large and conspicuous sub-apical spot extending from the costa to the lower sub-costal nervule.

Female. Upperside, both wings blackish. *Forewing* with the costa and outer margin darker; cilia of the forewing pale, of the hindwing white. Underside, both wings as in the male (Doherty).

HABITAT.—Margherita, Upper Assam.

We have not seen this species; the types are in the Indian Museum, Calcutta; the figures are copies of Doherty's figure.

#### INDO-MALAYAN AND CHINESE ALLIED GENERA AND SPECIES.

*Pithecopa phœnix*, Plebeius phœnix, Rober, Iris, 1886, p. 61, pl. 4, fig. 26. Habitat, E. Celebes.

*Pithecopa nihana*, Moore, Proc. Zool. Soc. 1878, p. 702. Habitat, Hainan.

Genus, *Una*, de Nicéville, Butt. of India, iii. p. 51 (1890).

*Una usta*, Zizera (?) usta, Distant, Ann. Mag. Nat. Hist. 1886, p. 531; id. Rhop. Malaya, p. 454, pl. 44, fig. 5 (1886). Habitat, Malay Peninsula.

## Genus SPALGIS.

*Lucia*, Westwood (part), Gen. Diurn. Lep. ii. p. 501 (1852).

*Spalgis*, Moore, Proc. Zool. Soc. 1879, p. 137. de Nicéville, Butt. of India, iii. p. 54 (1890). Bingham, Fauna of Brit. India, Butt. ii. p. 310 (1907).

Eyes naked; antennæ about half as long as the costa of forewing, club long and gradual; palpi sub-porrect, third joint short, about one-third the length of the second; legs short. *Forewing*, costa slightly arched, apex not rounded; outer margin convex, lower angle somewhat angulate; hinder margin straight; vein 3 from before lower end of cell, 5 from junction of middle and lower discocellulars, these latter sub-equal; veins 6 and 7 closely approximate from upper end of cell, upper discocellular therefore absent; vein 8 absent; 9 from apex of basal third of 7; 10 and 11 free from apical third of sub-costal. *Hindwing*, costa somewhat straight, apex, outer margin and lower angle roundly arched; cell about half the length of the wing; upper discocellular very oblique, middle and lower vertical; veins 3 and 4 from lower end of cell; 7 from a little before upper end (Bingham). *Egg*, flattened above and delicately reticulated with irregular hexagons (Doherty).

Type, *S. epius*, Westwood.

## SPALGIS EPIUS.

Plate 628, figs. 3, ♂, 3a, ♀, 3b, ♂ (imago), 3c (dorsal view of pupa, slightly enlarged), 3d (dorsal view of pupa, highly magnified), 3e (side view of pupa, slightly enlarged).

*Lucia epius*, Westwood, Gen. Diurn. Lep. ii. p. 502, pl. 76, fig. 5, ♀ (1852).

*Spalgis epius*, Moore, Proc. Zool. Soc. 1879, p. 137; id. Lep. Ceylon, i. p. 72, pl. 34, figs. 1, ♂, 1a, ♀ (1881). Hampson, Journ. As. Soc. Bengal, 1888, p. 356. de Nicéville, Butt. of India, iii. p. 55, pl. 26, fig. 163, ♂ (1890). Swinhoe, Trans. Ent. Soc. 1893, p. 292. Aitken, Journ. Bo. Nat. Hist. Soc. 1894, p. 485, pl. A, B. Davidson, Bell and Aitken, id. 1896, p. 372 (life history). Aitken and Comber, id. 1903, vol. xv. p. 47. Bingham, Fauna of Brit. India, Butt. ii. p. 311 (1907).

**IMAGO.**—Male. Upperside brownish-black, a small whitish spot beyond the cell, varying a little in size and sometimes quadrate, no other markings; cilia whitish, becoming brown towards apex of forewings. Underside pale grey, uniform in coloration in some specimens, with a discal transverse obscure fascia on the forewing in others; both wings crossed by numerous, very slender dark brown strigæ, which are outwardly edged by whitish, an anteciliary dark brown line, inwardly edged by whitish. *Forewing* with a round white spot beyond the cell.

Female. *Forewing*. Upperside with broad costal and outer marginal borders, the latter nearly black, the former paling gradually towards the base of the wing; a black spot at the end of the cell, a short white streak beyond it, the rest of the wing

pale, somewhat whitish tinged with blue-grey. *Hindwing* with a very broad, nearly black costal border, occupying a third of the wing space, curving round the apex and gradually narrowing hindwards, a black linear mark at the end of the cell, a suffused whitish streak beyond it, and the rest of the wing pale coloured as in the forewing, but a little darker than it is in that wing. Underside like the male. Antennæ black, ochreous at apex of club; head and body brown above, paler beneath; palpi and thorax greyish beneath.

Expanse of wings, ♂ ♀  $1\frac{1}{10}$  inches.

**LARVA.**—Carnivorous, covered with minute dark bristles and furnished with a lateral fringe of hairs. Moore figured a larva and pupa in *Lep. Ceylon* (plate 34, fig. 1b, larva and pupa) of *Rathonda amor*, Fabricius, by mistake (Moore's notes). This information was given him by E. E. Green, of Ceylon. Green states that the real larvæ are dull olive-green above, with numerous minute dark bristles and a lateral fringe of dark brown hairs, beneath pale green, slightly suffused with pink on anterior segments; it feeds on *Dactylopius adonidum* (the mealy bug of planters), and partially covers and conceals itself with the mealy secretion from the *Dactylopius*.

**PUPA.**—Various shades of brown, wing cases pale. E. H. Aitken confirms this in a very interesting paper in the *Journal of the Bombay Nat. Hist. Society*, 1894, p. 485; he states that he found the larvæ covered with the white, woolly secretion of the mealy bug; he brushed this off, and found that they were of the woodlouse form so common among the larvæ of the *Lycænidæ*; of a greenish-brown colour, with a few hairs scattered over the back, and a fringe of bristles running along the side and round the front, where the second segment conceals the head; with this fringe he saw them shovel a quantity of the white stuff on to their backs, and clothe their nakedness after he had denuded them. He says, "Watching them with a lens, I soon saw that they were feeding among the mealy bugs; they would pass over the larger individuals and bury their heads in the downy covering of a little one, and though I could not say I actually saw that they devoured it, I was quite satisfied that this was what they did."

We represent on Plate 628 copies of Aitken's figures of the pupa, slightly enlarged and also highly magnified. W. J. Holland, in *Psyche*, vi. p. 201, pl. 4 (1892), published a similar drawing of the pupa of *Spalgis s-signata*, Holland, from Africa, exhibiting when magnified this extraordinary resemblance to the face of an ape or chimpanzee.

**HABITAT.**—India, Burma, Ceylon.

**DISTRIBUTION.**—Hampson records it from the Nilgiris, Davidson from Karwar, Aitken from Bombay, de Nicéville from Caleutta, Burma and Ceylon; it is in our collection from Orissa and the Khasia Hills; it is in the B. M. also from Sikkim, Bhutan, Bhamo, Rangoon, and Penang.

## SPALGIS NUBILUS.

Plate 629, figs. 1, ♂, 1a, ♀, 1b, ♂.

*Spalgis nubilus*, Moore, Proc. Zool. Soc. 1883, p. 522. Distant and Pryer, Ann. Mag. Nat. Hist. 1887, p. 266. de Nicéville, Butt. of India, iii. p. 56 (1890). Watson, Journ. Bo. Nat. Hist. Soc. 1897, p. 658. Bingham, Fauna of Brit. India, Butt. ii. p. 311 (1907).

IMAGO.—Male. Upperside darker than in *Epius*, nearly pure black; a black spot at the end of the cell, hardly visible, no other markings. Underside darker, with a silky lustre, markings as in *Epius*.

Female, like that sex of *Epius*, but the pale spaces on both wings much restricted.

Expanse of wings, ♂ ♀ 1 inch.

HABITAT.—Ceylon, Andamans, Nicobars.

DISTRIBUTION.—It is in the B. M. from Ceylon, and in our collection from Port Blair; de Nicéville records it from Borneo; the type in the B. M. is from the Andamans.

## INDO-MALAYAN AND CHINESE ALLIED SPECIES.

*Spalgis substrigata*, Lucia (?) *substrigata*, Snellen, Tijd. voor Ent. xxi. p. 15 (1878). Habitat, Celebes.

*Spalgis dilama*, Lucia *dilama*, Moore, Proc. Zool. Soc. 1878, p. 701. Habitat, Hainan.

*Spalgis fangola*, Lucia *fangola*, Kheil, Rhop. Nias, p. 28, pl. 5, fig. 31. Habitat, Nias.

## Genus TARAKA.

*Taraka*, de Nicéville, Butt. of India, iii. p. 57 (1890). Bingham, Fauna of Brit. India, Butt. ii. p. 312 (1907).

Eyes naked; antennæ much as in *Pithecopus*, slender, with a short, distinct terminal club; palpi sub-porrect, third joint sub-fusiform, about half the length of the second; body slender; legs short, stout, covered with very long hairs, tibiae swollen in the middle; tarsi as long as the tibiae. *Forewing*, costa rounded, apex rather acute, outer margin convex, hinder margin concave; cell not half the length of the wing, discocellulars slender, upper very short, lower the longest; vein 8 absent, 9 from middle of 7; 10 and 11 free, from apical half of sub-costal; 12 short, terminating on costa before end of cell. *Hindwing* long and narrow, costa long, outer margin rounded, composed of two curves meeting at the end of the second sub-costal nervule; cell less than half the length of the wing, vein 3 from a little before lower end of the cell, 7 from a little before the upper end, 8 long, strongly curved upwards at base, then nearly straight to the apex of the wing.

Type, *T. hamada*, Druce.

Dr. Chapman says its genitalia is not near anything else he has yet examined.

## TARAKA HAMADA.

Plate 629, figs. 2, ♂, 2a, ♀, 2b, ♂ (Wet-season Brood), 2c, ♂, 2d, ♀ (Dry-season Brood).

*Miletus hamada*, Druce, Cist. Ent. i. p. 361 (1875). Elwes, Proc. Zool. Soc. 1881, p. 882. de Nicéville, Journ. As. Soc. Bengal, 1883, p. 76, pl. 1, fig. 16, ♀. Doherty, Journ. As. Soc. Bengal, 1886, p. 132. Leech, Proc. Zool. Soc. 1887, p. 409. Pryer, Rhop. Niphonica, p. 10, pl. 2, fig. 12, ♀ (1886).

*Neopithecops hamada*, Elwes, Trans. Ent. Soc. 1888, p. 374, pl. 11, fig. 2, ♀.

*Taraka hamada*, de Nicéville, Butt. of India, iii. p. 58, pl. 26, fig. 164, ♀ (1890). Watson, Journ. Bo. Nat. Hist. Soc. 1891, p. 44. Elwes, Proc. Zool. Soc. 1892, p. 621. Swinhoe, Trans. Ent. Soc. 1893, p. 292. Watson, Journ. Bo. Nat. Hist. Soc. 1897, p. 658. Bingham, Fauna of Brit. India, Butt. ii. p. 312 (1907).

Wet-season Brood (Figs. 2, ♂, 2a, ♀, 2b, ♂).

IMAGO.—Male and Female. Upperside rather pale black, very uniform in colour, no markings, but the spots on the underside slightly showing through the wings. Underside white, with black spots and markings. *Forewing* with a basal streak and a streak adjoining, followed by an ante-medial transverse band complete to the cell, where it is disjointed and has a disconnected spot on the costa; a medial band, disjointed in the middle; two spots from the costa; a band of post-discal spots; a sub-terminal series of small round spots and a row of triangular spots on the outer margin. *Hindwing* with a basal spot, followed by a band disconnected in its middle, then two short streaks in echelon, with three pairs of spots below them; a sub-terminal series of round spots decreasing in size hindwards and a marginal black line.

Expanse of wings, ♂ ♀  $1\frac{1}{10}$  inches.

Dry-season Brood (Figs. 2c, ♂, 2d, ♀).

Male. Upperside more transparent, the spots showing through the wing more plainly. *Forewing* with the basal two-thirds of the wing pale; a white streaky patch beyond the lower end of the cell. *Hindwing* also pale; the spots quite as apparent. Underside as in the other form.

Female. Much paler than the male. *Forewing* mostly pure white, leaving a broad costal and outer brown border. *Hindwing* pale brown; costal and outer portions darker brown. Underside as in the male.

Expanse of wings, ♂ ♀ 1 inch.

HABITAT.—Sikkim, Assam, Burma, Malayana.

DISTRIBUTION.—Watson records it from the Chin Hills, Elwes from the Naga and Karen Hills, de Nicéville from Cachar, Chittagong, Tenasserim, E. Java, China; and in our collection from the Khasia Hills, Sikkim and Yokohama; some of the Japanese examples are very small; it is in the B. M. also from the Shan States, Moupin, Shanghai, Foochow, and Chusan.

## INDO-MALAYAN ALLIED SPECIES.

*Turaka mahanetra*, Doherty, Journ. As. Soc. Bengal, 1889, p. 129. Habitat, Malay Peninsula.

## Genus CASTALIUS.

*Castalius*, Hübner, Verz. bek. Schmett. p. 70 (1816). Moore, Lep. Ceylon, i. p. 82 (1881). Distant, Rhop. Malayana, p. 214 (1884). de Nicéville, Butt. of India, iii. p. 195 (1890). Bingham, Fauna of Brit. India, Butt. ii. p. 421 (1907).

*Forewing* triangular, costa arched, hinder angle angulated, outer margin rounded, cell more than half the length of the wing, vein 7 before upper end of the cell, 8 absent, 9 from middle of 7, 10 emitted closer to base of 11 than to base of 7, 11 anastomosing with 12, sometimes only just touching it, 12 ends on costa before upper end of cell. *Hindwing* almost evenly rounded, anal angle rather sharp, cell less than half the length of wing; veins 3 and 4 from lower angle of the cell, 7 from a little before upper angle, 8 arched, terminating at the apex of the wing. Antennæ less than half the length of the costa of forewing, club long, gradual, blunt at the end; palpi sub-porrect, densely clothed in front, third joint long, body slender, a slender tail to hindwing; eyes naked.

Type, *C. rosmon*, Fabricius.

## CASTALIUS ANANDA.

Plate 629, figs. 3, ♂, 3a, ♀, 3b, ♂ (imago), 3c (larva and pupa).

*Castalius ananda*, de Nicéville, Journ. As. Soc. Bengal, 1883, p. 75, pl. 1, figs. 11, ♂, 11a, ♀. Hampson, id. 1888, p. 357. de Nicéville, Butt. of India, iii. p. 198 (1890). Swinhoe, Trans. Ent. Soc. 1893, p. 299. Davidson, Bell and Aitken, Journ. Bo. Nat. Hist. Soc. 1896, p. 379, pl. 4, fig. 3, 3a (larva and pupa). Watson, Journ. Bo. Nat. Hist. Soc. 1897, p. 662. Bingham, Fauna of Brit. India, Butt. ii. p. 423 (1907).

**IMAGO.**—Male. Upperside dark purple, with narrow, uniform, black, marginal borders to both wings; the spots of the underside generally showing through the wings. Underside dull white, markings black. *Forewing* with a band from the base to the costa before the middle; a bar from the middle of the costa to the middle of the wing; on its inner side there is another bar extending hindwards to vein 1, and sometimes touches the second bar, sometimes does not; a post-discal macular band, with the spots sometimes joined together, sometimes more or less well separated. *Hindwing* with basal and sub-basal transverse bands, sometimes broken; a medial band usually of two pieces; both wings with sub-terminal and anteciliary uniform rows of small spots. Antennæ black, ringed with white; head and body black above, white beneath.

Female, like the male. Upperside with the ground colour usually very much paler; the markings of the underside showing conspicuously through the wings.

Expanse of wings, ♂ ♀ 1 inch.

**LARVA.**—Feeds on *Zizyphus xylopyrus* and *Z. loranthus*, only on the parenchyma of the leaf, is of the usual woodlouse form, slightly flattened; head concealed in the second segment, surface more or less rough; a fringe of long white bristles all round, with an erected ridge of similar bristles along the back from the 2nd segment, those on the 3rd to 7th segments, and the last two, much longer than the others, those on the 2nd segment very few, short and black. It has a conspicuous gland on the 12th segment, and is attended by a small species of ant of the genus *Cremastogaster*. Its colour is pale green; the dorsal portion of the 2nd, 4th, 5th, 6th and last two segments being park brown, while the centre segments are almost yellow with a darker dorsal line.

**PUPA.**—Of the usual *Castalius* form, but narrow and slightly flattened. It is intensely glossy, as if covered with gum. It varies in colour, being sometimes black, at others green, with inconstant black markings.

**HABITAT.**—Sikkim, Orissa, Southern India.

**DISTRIBUTION.**—The type came from Sikkim; Hampson records it from the Nilgiris, Watson from the Chin Hills; we have received many examples from the Khasia Hills; it is in the B. M. also from the Nilgiris and N. Kanara.

#### CASTALIUS ROSIMON.

Plate 630, figs. 1, ♂, 1a, ♀, 1b, ♂ (Wet-season Brood), 1c, ♂, 1d, ♀, 1e, ♀ (Dry-season Brood), 1f, ♂, 1g, ♀ (Extreme Dry-season Brood).

*Papilio rosimon*, Fabricius, Syst. Ent. p. 523 (1775); id. Sp. Ins. ii. p. 121 (1781); id. Mant. Ins. ii. p. 71 (1787). Herbst pl. 289, figs. 5 to 7 (1800).

*Hesperia rosimon*, Fabricius, Ent. Syst. iii. (i.) p. 288 (1793).

*Polyommatus rosimon*, Godart, Enc. Méth. ix. p. 658 (1833).

*Lycenea rosimon*, Horsfield, Cat. Lep. E.I.C. p. 71 (1828). Snellen, Tijd. voor Ent. 1876, p. 152.

*Cupido rosimon*, Druce, Proc. Zool. Soc. 1874, p. 106.

*Lampides rosimon*, Wood-Mason and de Nicéville, Journ. As. Soc. Bengal, 1881, p. 235.

*Castalius rosimon*, Hübner, Verz. bek. Schmett. p. 70 (1816). Butler, Cat. Fabr. Lep. B. M. p. 162 (1869). Moore, Lep. Ceylon, i. p. 83, pl. 36, fig. 2 (1881). Hampson, Journ. As. Soc. Bengal, 1888, p. 357. de Nicéville, Butt. of India, iii. p. 197 (1890). Watson, Journ. Bo. Nat. Hist. Soc. 1890, p. 34. de Nicéville, id. p. 386. Manders, Trans. Ent. Soc. 1890, p. 529. Watson, Journ. Bo. Nat. Hist. Soc. 1891, p. 47. Betham, id. p. 179. Elwes, Proc. Zool. Soc. 1892, p. 628. Swinhoe, Trans. Ent. Soc. 1893, p. 299. Davidson, Bell and Aitken, Journ. Bo. Nat. Hist. Soc. vol. x. 1896, p. 379 (life history). Watson, id. 1897, p. 661. Mackinnon, id. 1898, p. 381. de Rhé-Philipe, id. 1902, p. 489. Aitken and Comber, id. vol. xv. 1903, p. 48. Bingham, Fauna of Brit. India, Butt. ii. p. 424 (woodeut) (1907).

*Papilio maimon*, Fabricius, Syst. Ent. p. 534 (1775); id. Sp. Ins. ii. p. 137 (1781); id. Mant. Ins. ii. p. 90 (1787).

*Hesperia maimon*, Fabricius, Ent. Syst. iii. (i.), p. 349 (1793).

*Papilio clyton*, Cramer, Pap. Exot. i. pl. 67, figs. F, G (1775).

*Castalius clyton*, Hübner, Verz. bek. Schmett. p. 695 (1816).  
*Polyommatus clyton*, Godart, Enc. Méth. ix. p. 679 (1823).  
*Papilio coridon*, Cramer, Pap. Exot. iv. pl. 340, figs. C, D, E (1781).  
*Castalius naxus*, Hübner, Verz. bek. Schmett. p. 70 (1816).  
*Castalius chota*, Swinhoe, Proc. Zool. Soc. 1885, p. 133.  
*Castalius approximatus*, Butler, Ann. Mag. Nat. Hist. 1886, p. 186.

Wet-season Brood (Figs. 1, ♂, 1a, ♀, 1b, ♂).

IMAGO.—Male. Upperside white, densely irrorated on the basal third of both wings with brilliant blue scales; all the markings black. *Forewing*. A narrow band on the costa; a fairly broad band on the outer margin; three large more or less round spots in an oblique row from the centre of the basal third to the costal fourth; five similar spots across the disc, the first on the hinder margin near the angle and generally touching the outer band, the second above and touching it, but a little more inwards, the third somewhat outwards touching the middle of the outer band, the fourth and fifth oblique, touching them, but are placed a little inwards, and all are usually joined together. *Hindwing* with the basal spots submerged in the brilliant blue scales; costal band narrow, continued round the apex joining the broad outer marginal band, which occupies a third of the wing, leaving merely a broad transverse medial band of white; the inner edging of the outer black band is composed of large spots running into each other, and within the band there is a regular series of white lunules. Underside white, all the markings deep black. *Forewing* with a straight black streak, which first crosses the base of the hindwing and runs to the costa of forewing a little before the middle; a very large spot in the middle third, sometimes pear-shaped; a band from the costa near the end of the streak to near the hinder margin a little before the angle, composed of large spots joined together, broken in the middle; a sub-apical band of four spots parallel to it, the third nearer the apex than the others, the lower three generally touching each other. *Hindwing* with a short sub-basal streak from the abdominal margin; a spot outside its upper end, and close outside this a band of six spots in three pairs, the pairs joined together, one above the other; both wings with a sub-terminal complete row of small, round spots; on the hindwing there are also some black spots close inside this row, and both wings have an anteciliary row of black dots. Cilia white, alternated with black; a filamentous short tail to the hindwing black, tipped with white. Antennæ black, ringed with white; head and body black above, white beneath.

Female. Upperside like the male, but the outer bands are much broader and the spots coalesce, leaving very little of the white ground colour on either wing. Underside is similar to the underside of the male, but most of the spots on the forewing are joined together into bands.

Expanse of wings, ♂ ♀  $1\frac{3}{10}$  inches.

## Dry-season Brood (Figs. 1c, ♂, 1d, ♀, 1e, ♀).

Male and Female. Upperside white, bands and spots black, but not of so deep a colour as in the Wet-season form, the blue basal irroration much more limited, the spots smaller, the outer bands narrower, that on the hindwing having the adjacent spots on its inner side disconnected from the band, and the row of white lunules inside it much more pronounced. Underside similar to the other form, but all the markings more attenuated.

Expanse of wings, ♂ ♀  $1\frac{1}{10}$  inches.

Extreme Dry-season Brood = *chota* (Figs. 1f, ♂, 1g, ♀).

A very minute form in both sexes; on the upper side the markings are very pale, and above and below they are very small.

Expanse of wings, ♂ ♀  $\frac{9}{10}$  to 1 inch.

**LARVA.**—Feeds on *Zizyphus jujuba*, and is of a rough texture as if shagreened all over. It is of the usual woodlouse form, much flattened towards the anal segment, which is very broad; head concealed; colour bright green with a double, dorsal, yellow line and the sides powdered with small yellow spots.

**PUPA.**—Fastened by the tail along a leaf horizontally (the band across the thorax being very lax). It is much contracted at the thorax, while the abdominal portion is large and rounded and much higher than the thorax. It is of a bright green with faint yellow bands on the abdomen and two or three black spots there. It also shows traces of a darker band in the centre of the abdomen (Davidson, Bell and Aitken).

**HABITAT.**—India, South of the Himalayas, Ceylon, Burma, Andamans, Nicobars and the Malay sub-region, a common species.

## CASTALIUS ETHION.

Plate 630, figs. 2, ♂, 2a, ♀, 2b, ♂ (imago), 2c (larva and pupa).

*Lycæna ethion*, Doubleday and Hewitson, Cat. Diurn. Lep. ii. p. 490, pl. 76, fig. 3, ♂ (1852).

Hewitson, Ex. Butt. v. (*Lycæna*), pl. 1, fig. 3, ♂ (1876). Snellen, Tijd. voor Ent. 1876, p. 152. *Cupido ethion*, Druce, Proc. Zool. Soc. 1874, p. 106.

*Castalius ethion*, Moore, Proc. Zool. Soc. 1877, p. 587; id. Lep. Ceylon, i. p. 83, pl. 36, figs. 5, 5a, ♂ (1881). Butler, Trans. Linn. Soc. Zool. 1877, p. 547. Wood-Mason and de Nicéville, Journ. As. Soc. Bengal, 1881, p. 248. Distant, Rhop. Malayana, p. 216, pl. 22, fig. 25, ♂ (1884). Hampson, Journ. As. Soc. Bengal, 1888, p. 357. de Nicéville, Journ. Bo. Nat. Hist. Soc. 1890, p. 386. Watson, id. p. 34, and 1891, p. 47. Elwes, Proc. Zool. Soc. 1892, p. 628. de Nicéville, Butt. of India, iii. p. 198 (1890). Davidson, Bell and Aitken, Journ. Bo. Nat. Hist. Soc. 1896, p. 380, pl. 4, figs. 4, 4a (larva and pupa). Bingham, Fauna of Brit. India, Butt. ii. p. 426 (1907).

IMAGO.—Male. Upperside dark blue with a broad white transverse band across both wings. *Forewing* with the costal line thickly black; a broad, even, outer marginal black border; the white band extends from the hinder margin to vein 6, and above vein 3 it projects outwards for a short distance; all the rest of the wing is dark blue. *Hindwing* with an outer marginal black band like that of the forewing; the white band continued across the wing, the remaining portion of the wing dark blue. Underside white, with black bands and spots. *Forewing* with an oblique sub-basal transverse band; a slightly broader parallel band on its outer side, narrowing upwards, and slightly bent inwards on to the costa at its middle; a discal band, composed of an outwardly curved streak from the costal third, thickening hindwards to vein 4; a small spot below it, and an erect band from vein 3 to vein 1 a little on the inner side. *Hindwing* with two short sub-basal bands in continuation of those on the forewing, a discal band of three large spots, the middle spot nearer the margin than the others; both wings with complete rows of sub-terminal and anteciliary spots, the former the larger, the two spots near the angle the largest, and a terminal black line. Cilia black, tipped with white. Antennæ, head and body black above and beneath; beneath the palpi, thorax and abdomen with a median, longitudinal white line; tails black, tipped with white.

Female. Upperside marked like the male, but the medial white band much broader, the blue coloration much restricted, sometimes almost entirely absent. Underside like the male, but the two oblique basal bands of the forewing generally further apart.

Expanse of wings, ♂ ♀  $1\frac{1}{10}$  inches.

LARVA.—Feeds on young shoots of *Zizyphus jujuba* and is of the woodlouse form, but flattened. Its texture, though apparently smooth, if looked at with a lens, is found to be thickly covered with white hairs; its colour is greenish-white, with a faint green dorsal band.

PUPA.—Similar in shape to that of *C. rosimon*, Fabricius, but smaller and narrower. It is of a bright apple-green, with a darkish green line down the centre. There are some red dots on the edges of the wing-cases (Davidson, Bell and Aitken).

HABITAT.—Assam, Burma, South India, Ceylon, extending into the Malay sub-region.

DISTRIBUTION.—Recorded by Hampson from the Nilgiris, by Watson from Mysore and Chin Lushai, and by Elwes from the Karen Hills, by Moore from Ceylon, by Davidson from Karwar; it is in the B. M. from Silhet (Hewitson's type), Chittagong, Upper Burma, Rangoon, Mergui, Siam, Andamans, Tonkin, Penang, Malacca, Singapore, Borneo and Java; and in our collection also from Bombay, Trevandrum, and the Andamans.

## CASTALIUS AIRAVATI.

Plate 631, figs. 1, ♂, 1a, ♀, 1b, ♂, 1c, ♀.

*Castalius airavati*, Doherty, Journ. As. Soc. Bengal, 1886, p. 261. de Nicéville, Butt. of India, iii. p. 199, Frontispiece, fig. 133, ♂ (1890). Bingham, Fauna of Brit. India, Butt. ii. p. 427 (wood-cut) (1907).

**IMAGO.**—Male. Allied to *C. ethion*, Doubleday and Hewitson. Upperside, both wings light shining blue, the outer borders broadly, and the costa of the wing narrowly black; a white band crosses both wings which has its upper part wide in the forewing, centering between the third medial and lower discoidal nervules, thence to the hind margin it is slender and almost obsolescent; on the hindwing it is narrow and angular. Underside, both wings with the ground ochreous-white (it is white in *C. ethion*), pure white on the lower part of the forewing. It differs from *C. ethion* below in the increased size of all the black markings. The transverse discal band across the hindwing, though irregular, is continuous, its two parts very close together, the upper one is widely united near the costa with the outer of the two oblique basal stripes; the latter are united in both wings, enclosing a narrow white band. The two lines of sub-marginal spots are less equal and regular than in *C. ethion*, the inner one being very large and forming an almost continuous and very heavy lunular line; the anal and sub-anal black spots are edged with silvery blue. Tail shorter than in *C. manluena*, Felder (Doherty).

Female. Upperside entirely lacking the blue gloss of the male; the discal white band rather narrower. *Forewing* with a somewhat rectangular, detached black spot, on the outer side of the white medial band. *Hindwing* with the white band prominently narrowed anteriorly by the encroachment on it of the inner portion of the black area on the termen. Underside ground colour and markings similar to that of its own male. Antennæ, head and body as in *C. ethion* (Bingham).

Expanse of wings, ♂ ♀  $1\frac{2}{10}$  inches.

**HABITAT.**—Nicobar Islands.

We have not seen this species; the types are in the Indian Museum, Calcutta; the figures are copied from de Nicéville's and Bingham's figures.

## CASTALIUS ROXUS.

Plate 631, figs. 2, ♂, 2a, ♀, 2b, ♂.

*Polyommatus roxus*, Godart, Enc. Méth. ix. p. 659 (1823).

*Lycæna roxus*, Horsfield, Cat. Lep. E.I.C. p. 70, pl. 2, fig. 4, 4a, ♀, 4b to 4f (structure of imago) (1828).

*Cupido roxus*, Druce, Proc. Zool. Soc. 1873, p. 348.

*Castalius roxus*, Butler, Trans. Linn. Soc. Zool. 1877, p. 547. Moore, Proc. Zool. Soc. 1878, p. 833. Wood-Mason and de Nicéville, Journ. As. Soc. Bengal, 1881, p. 248. Distant, Rhop. Malayana, p. 216, pl. 22, fig. 24, ♂ (1884). Elwes and de Nicéville, Journ. As. Soc. Bengal, 1886, p. 428. de Nicéville, Butt. of India, iii. p. 199 (1890). Manders, Trans. Ent. Soc. 1890, p. 529. Elwes, Proc. Zool. Soc. 1892, p. 628. Bingham, Fauna of Brit. India, Butt. ii. p. 428 (1907).

**IMAGO.**—Male. Upperside black; crossed by an oblique, medial white band extending from just above vein 5 of the forewing to the abdominal margin of the hindwing. *Forewing*. The band has a short production outwards, its end being nearly square. *Hindwing*. Band broader and fairly uniform in width throughout. Underside white; all the markings black; a very broad sub-basal band across both wings; a discal narrower band; in the forewing disjointed below the middle, the lower piece rather broader and a little on the inner side; on the hindwing this band consists of three rather broad linear markings, more or less joined together, the middle one nearer the margin than the others; both wings with a sub-terminal series of black lunules and a marginal black line, showing a series of white spots between them. Cilia black, tail long, black, tipped with white. Antennæ, head and body black; the abdomen barred with white at the sides; palpi, thorax and abdomen white down the middle on the underside.

Female, like the male, but the white medial band on the upperside is distinctly broader, the inner edge of the terminal black band of the hindwing is irregular, and the black bands on the underside are usually also broader.

Expanse of wings, ♂ ♀  $1\frac{1}{10}$  inches.

**HABITAT.**—Burma, Andamans, extending in the Malay sub-region as far as the Philippines.

**DISTRIBUTION.**—Manders records it from the Shan States, and Elwes from the Karen Hills; it is in our collection from the Andamans, Java and Borneo.

#### CASTALIUS ROXANA.

Plate 631, figs. 3, ♂, 3a, ♀, 3b, ♂.

*Castalius roxana*, de Nicéville, Journ. Bo. Nat. Hist. Soc. 1897, p. 633. Watson, Journ. Bo. Nat. Hist. Soc. 1897, p. 661.

*Castalius roxus*, Bingham (part), Fauna of Brit. India, Butt. ii. p. 428 (1907).

**IMAGO.**—Male. Upperside black. *Forewing* with a broad, medial, white, transverse band, from just above vein 5 to the hinder margin; at its commencement it is produced outwards above vein 3, in a nearly square form. *Hindwing* with an oblique continuation of the white band to the abdominal margin, but much broader than it is on the forewing, leaving only a small basal space black, and the outer black border very broad. Underside white. *Forewing* with the costal line thickly black; a rather broad

oblique sub-basal black straight band (which is continued across the base of the hindwing); a post-discal black band from the costa near the outer edge of the other band, curved outwards towards the margin, and at the middle almost joining a black short band, which is a little inwards, and does not reach the hinder margin. *Hindwing* with a post-discal band of the same width almost macular and with a curve outwards in its middle, both wings with a narrow black marginal band containing a series of white lunules. Head and body black above, white beneath. Antennæ black, with white bands beneath.

Female differs from the male in the greater extension of the white band above, which occupies nearly the whole of both wings, leaving the black bands narrow with its interior edges very uneven. Underside with the markings similarly disposed, the bands narrower.

Expanse of wings, ♂  $1\frac{2}{10}$ , ♀ 1 inch.

HABITAT.—Upper Burma.

DISTRIBUTION.—Watson records it from the Chin Hills; the type came from Upper Burma; in the B. M. from the Shan States and Karen Hills.

#### CASTALIUS MANLUENA.

Plate 632, figs. 1, ♂, 1a, ♀, 1b, ♂, 1c, ♀.

*Lycæna manluena*, Felder, Verh. Zool.-bot. Ges. Wien, xii. p. 484 (1862).

*Castalius manluena*, Moore, Proc. Zool. Soc. 1877, p. 587. Doherty, Journ. As. Soc. Bengal, 1886, p. 261; id. l.c. 1889, p. 134, pl. 10, fig. 8, ♂. de Nicéville, Butt. of India, iii. p. 200 (1890).

IMAGO.—Male. Upperside black, a broad transverse white band from the upper disc near the costa of forewing to the abdominal margin of hindwing before the middle, just entering the cell of forewing, indented above, and also outwardly between veins 3 and 4; on the hindwing it is somewhat broader, and is strongly produced outwardly, acutely indented inwardly; on both wings also there is a slender marginal white line, broken at the veins, and a pale whitish post-discal line. Underside coloured like the upperside, the white band broader. *Forewing* with a white sub-costal streak from the base to the middle, a white post-discal transverse band, narrowing and somewhat irregular hindwards, and a terminal series of white spots. *Hindwing* with the band somewhat irregular and divided by the veins, and produced outwardly below its middle, a post-discal irregular white band and a series of terminal white spots. Antennæ black ringed with white; head and body black above, paler beneath, tails black, tipped with white.

Female. Upperside like the male, but somewhat paler, the band on the hindwing broader and more regular. Underside also like the male, but the bands are complete and not broken.

Expanse of wings, ♂ ♀ 1 inch.

HABITAT.—Nikobar Islands.

DISTRIBUTION.—Felder's type, female, which we figure through the kindness of the Hon. Walter Rothschild, came from Kondul; Doherty captured a male in Ikuya, Little Nikobar.

### CASTALIUS ELNA.

Plate 632, figs. 2, ♂, 2a, ♀, 2b, ♂ (Wet-season Brood), 2c, ♂, 2d, ♀, 2e, ♀ (Dry-season Brood).

*Lycæna elna*, Hewitson, Ex. Butt. v. (Lycæna), pl. 1, fig. 8, ♀ (1876).

*Castalius elna*, Moore, Proc. Zool. Soc. 1877, p. 587. Wood-Mason and de Nicéville, Journ. As. Soc.

Bengal, 1881, p. 248. Distant, Rhop. Malayana, p. 217, pl. 20, fig. 4 (1884). de Nicéville, Butt. of India, iii. p. 201 (1890). Elwes, Proc. Zool. Soc. 1892, p. 628. Swinhoe, Trans. Ent. Soc. 1893, p. 299. Bingham, Fauna of Brit. India, Butt. ii. p. 430 (wood-cut, p. 429) (1907).

Wet-season Brood (Figs. 2, ♂, 2a, ♀, 2b, ♂).

IMAGO.—Male. Upperside black; a broad, oblique, white band across both wings. *Forewing* with this band slightly produced both outwards and inwards at its commencement in the upper disc and broadens hindward. *Hindwing* with a continuation of this band of fairly equal breadth. Underside white. *Forewing* with a broad black band from the lower base to the middle third of the wing, where it is sharply angled on to the costa; a large black spot on the costa between it and the apex; a large black spot below it near the hinder angle, a marginal thin band with a spot inside its middle and sometimes attached to it, but this band is inconstant, and is often broken and irregular, and sometimes almost obliterated. *Hindwing* with a continuation at its base of the basal band of the forewing, a discal band of what appears to be a number of large spots joined together, a marginal narrow band of triangular spots; tails black, with white tips. Antennæ black, speckled with white; head and body black above; palpi and body beneath with a medial white line; sides of abdomen barred with white.

Female, like the male above and below.

Expanse of wings, ♂ ♀  $1\frac{3}{10}$  inches.

Dry-season Brood (Figs. 2c, ♂, 2d, ♀, 2e, ♀).

Male and female only differ on the upperside in the breadth of the white, oblique band, which in this form is very much broader throughout, on the underside the costal and outer marginal spaces are suffused with pale chocolate colour, and the discal and outer marginal bands of the hindwing are almost obliterated.

Expanse of wings, ♂ ♀  $1\frac{3}{10}$  inches.

HABITAT.—Sikkim, Bhutan, Assam, Burma, South Andamans, extending to the Malayan sub-region.

DISTRIBUTION.—It is in the B. M. from Silhet, Sikkim, Bhutan, Shillong, the Karen Hills and the Andaman Islands; we have received many examples from the Khasia Hills.

#### CASTALIUS DECIDIA.

Plate 633, figs. 1, ♂, 1a, ♀, 1b, ♂ (Wet-season Brood = *hamata*), 1c, ♂, 1d, ♀ (Dry-season Brood), 1e, ♂, 1f, ♀, 1g, ♀ (Extreme Dry-season Brood).

*Lycæna decidia*, Hewitson, Ex. Butt. v. (Lycæna), pl. 1, fig. 4 (1876).

*Castalius decidia*, Moore, Lep. Ceylon, i. p. 84 (1881) de Nicéville, Butt. of India, iii. p. 201 (1890).

Manders, Trans. Ent. Soc. 1890, p. 529. Davidson and Aitken, Journ. Bo. Nat. Hist. Soc. 1890, p. 353, and 1896, p. 380. Betham, id. 1891, p. 179. Watson, id. p. 47, and 1897, p. 661. Aitken and Comber, id. vol. xv. 1903, p. 48. Bingham, Fauna of Brit. India, Butt. ii. p. 430 (wood-cut) (1907). de Rhé-Philipe, Journ. Bo. Nat. Hist. Soc. 1908, p. 885.

*Castalius hamatus*, Moore, Lep. Ceylon, i. p. 84, pl. 36, figs. 6, 6a (1881). Hampson, Journ. As. Soc. Bengal, 1888, p. 357.

*Castalius interruptus*, de Nicéville, Journ. As. Soc. Bengal, 1883, p. 74, pl. 1, fig. 12, ♀. Moore, Proc. Zool. Soc. 1883, p. 523, pl. 48, fig. 4. Hampson, Journ. As. Soc. Bengal, 1888, p. 357. Watson, Journ. Bo. Nat. Hist. Soc. 1890, p. 34.

Wet-season Brood = *hamatus*, Moore (Figs. 1, ♂, 1a, ♀, 1b, ♂).

IMAGO.—Male. Upperside black, with a very narrow, white, oblique band on both wings; on the forewing it is produced outwards above vein 3, and is crossed by black veins on both wings. Underside white, markings black. *Forewing* with two short streaks from the base, the first costal, the other below it; a broad outwardly curved ante-medial band; a large inwardly curved spot on the costal fourth, and another below it, near the hinder angle; an apical small patch; a square spot on the middle of the outer margin; an anteciliary line running through a regular series of small spots. *Hindwing*, with a band from the base, bent upwards; a large irregular spot, or patch of spots, at the apex, two small ones in the disc, a long transverse spot on the abdominal margin above the anal angle, a spot on this margin in its middle; an anteciliary line, running through a series of small spots, and a row of lunules on the inner side of the line. Tails black, with white tips; cilia white checkered with black. Antennæ, head and body black above; palpi and body white beneath.

Female only differs from the male in having a broader white band above.

Expanse of wings, ♂ 2 1/10 inches.

Dry-season Brood (Figs. 1c, ♂, 1d, ♀).

Male and female differ from the Wet-season form in having broader white bands on both wings above.

Expanse of wings, ♂ 2 1/10 inches.

Extreme Dry-season Brood = *interruptus* (Figs. 1e, ♂, 1f, ♀, 1g, ♀).

Male and Female. Upperside white. *Forewing* with a broad black band, that commences at the base, runs along the costa, in the middle of which there is a slight excavation, runs round the apex and outer margin and curves with a square ending a little inwards and a small upward streak at the angle. *Hindwing* with a little black at the base, a somewhat narrow, outer marginal black border, all the rest of both wings pure white. Underside with the markings very small, the streak in the middle of the abdominal margin of hindwing absent, as also is the lower discal spot; the sub-terminal lunules very much constricted.

Expanse of wings, ♂ ♀  $1\frac{1}{10}$  inches.

**LARVA.**—Feeds on the tender leaves of the “chorna,” *Zizyphus rugosa*; pale green, of the usual woodlouse form, with the head concealed under the second segment. The whole body is more or less pubescent, and there is a fringe of longer hairs on each side; it may be known from the larva of *C. ethion* by having two green bands on the back instead of one.

**PUPA.**—Short and stout, constricted between the thorax and abdomen, clothed with short hair, closely attached by tail and band to any convenient surface; colour ochreous mottled with brown (Davidson and Aitken).

**HABITAT.**—Sikkim, Assam, Western and Southern India, Burma, Ceylon.

**DISTRIBUTION.**—Recorded by Hampson from the Nilgiris, by Manders from the Shan States, by Davidson from Karwar, by Betham from the Central Provinces, by Watson from Chin Lushai, by Aitken from Salsette and Matheran, by de Rhé-Philipe from the Konkan; it is in the B. M. from Mysore, Nilgiris (Hewitson's type), Ceylon (Moore's type), Calcutta, Sikkim, Maldah, Maulmein, Tilin Yaw; and many examples in our collection from the Khasia Hills.

#### ALLIED INDO-MALAYAN SPECIES.

*Castalius ilissus*, Danis ilissus, Felder, Wien, Ent. Mon. iii. p. 186 (1859). *Lycæna ilissus*, Felder, Reise, Nov. Lep. ii. pl. 33, figs. 25, 26 (1865). Habitat, Celebes.

*Castalius rhode*, *Lycæna rhode*, Hopffer, Stett. Ent. Zeit. 1874, p. 27. *Synonym*, *Castalius roxus*, var. *celebensis*, Staudinger, Iris, 1889, p. 96. Habitat, Celebes.

*Castalius argola*, *Lycæna argola*, Hewitson, Ex. Butt. v. (*Lycæna*), pl. i. fig. 7, ♀ (1876). Semper, Reise, Philipp. v. p. 188 (1890). Habitat, Philippines.

*Castalius angustior*, *Castalius roxus*, var. *angustior*, Staudinger, Lep. Palawan, p. 95 (1889). Semper, l.c. p. 189. Habitat, Philippines.

*Castalius ulysses*, Staudinger, l.c. pl. i. fig. 5, ♂. Semper, l.c. p. 188. Habitat, Philippines.

*Castalius morosi*, Semper, l.c. p. 187, pl. 33, fig. 14, ♂ (1890). Habitat, Philippines.

*Castalius austini*, Heron, Ann. Mag. Nat. Hist. 1894, p. 193. Habitat, Damma Island.

*Castalius ulyssides*, Grose-Smith, Nov. Zool. ii. p. 511 (1895). Habitat, Celebes.

*Castalius niasana*, nov. *Male*. Upperside pale greyish-blue; a white transverse band from vein 6 of forewing, expands outwards above vein 3, is uniform on that wing, expands outwards in its middle on the hindwing; forewing with a black costal line; both wings with a thin black more or less macular band, white terminal line, black cilia; wings rather transparent, nearly all the markings of the underside showing through. Underside as in *C. ethion*, but there is a thick linear spot at the end of the cell of both wings. Expanse 1½ inches. Habitat, Nias. Type in the B. M. from coll. Godman, and three other examples from the Crowley Bequest.

### Genus TARUCUS.

*Tarucus*, Moore, Lep. Ceylon, i. p. 81 (1881). de Nicéville, Butt. of India, iii. p. 186 (1890). Bingham, Fauna of Brit. India, Butt. ii. p. 417 (1907).

Eyes naked; closely allied to *Castalius*. Forewing, cell a little longer, vein 9 from beyond middle of 7, costa more slightly arched. Hindwing with vein 7 from apical half of sub-costal. Antennæ half the length of costa of forewing, club fusiform; though closely allied to *Castalius* in venation and general structure, it is much more widely distributed, occurring in Europe, Africa, Western Asia, Asia Minor, Persia, India and Ceylon, but apparently not in the Andamans, Nicobars, or the Malay Peninsula; in so far as our researches go, it is only represented by two species in the Indian region, *Theophrastus*, Fabricius, and *Venosus*, Moore; the so-called *Tarucus plinius* belongs to another group of the family, having hairy eyes and other material differences; in colour and pattern *Tarucus* differs from *Castalius*, the upperside of the wings being always more or less of a uniform greyish-purple colour above, with black spots on a white ground beneath, and therefore for the sake of convenience we think it advisable to keep it distinct.

Type, *T. theophrastus*, Fabricius.

### TARUCUS THEOPHRASTUS.

Plate 634, figs. 1, ♂, 1a, ♀, 1b, ♂ (Wet-season Brood), 1c, ♂, 1d, ♀, 1e, ♀ (Dry-season Brood), 1f, ♂, 1g, ♀, 1h, ♂ (Extreme Dry-season Brood).

*Hesperia theophrastus*, Fabricius, Ent. Syst. iii. p. 281 (1793).

*Polyommatus theophrastus*, Godart, Enc. Méth. ix. p. 658 (1823).

*Lycæna theophrastus*, Lucas, Expl. Alg. Zool. iii. p. 362. Lep. pl. i. fig. 6, 6a, ♂, 6b, antennæ (1849). Horsfield, Cat. Lep. E.I.C. p. 73 (1828). Horsfield and Moore, Cat. Lep. Mus. E.I.C. i. p. 25 (1857). Moore, Proc. Zool. Soc. 1865, p. 772. Lang, Butt. of Europe, p. 140 (1884).

*Lampides theophrastus*, Butler, Cat. Fabr. Lep. B. M. p. 164 (1869).

*Tarucus theophrastus*, Moore, Lep. Ceylon, i. p. 81, pl. 36, fig. 3 (1881). Butler, Proc. Zool. Soc. 1883, p. 148, and 1884, p. 484. Swinhoe, id. 1885, p. 134, and 1886, p. 438. Doherty, Journ. As. Soc. Bengal, 1886, pp. 122 and 132. de Nicéville, Butt. of India, iii. p. 187 (1890). Davidson, Bell and Aitken, Journ. Bo. Nat. Hist. Soc. 1890, p. 353. Watson, id. 1891, p. 46. Betham,

id. 1891, p. 179. Mackinnon and de Nicéville, id. 1898, p. 381. Bingham, Fauna of Brit. India, Butt. ii. p. 417, pl. 20, fig. 151, ♂ (1907).

*Lycæna psittacus*, Allard, Ann. Soc. Fr. 1867, p. 313.

*Lycæna nara*, Kollar, Hügel's Kaschmir, iv. p. 421 (1848).

*Tarucus nara*, Butler, Proc. Zool. Soc. 1881, p. 606, and 1886, p. 366. Butler, Ann. Mag. Nat. Hist. 1888, p. 147. Moore, Proc. Zool. Soc. 1882, p. 245. Swinhoe, id. 1884, p. 506, and 1885, p. 134, and 1886, p. 427. de Nicéville, Butt. of India, iii. p. 190 (1890).

*Tarucus alteratus*, Moore, Proc. Zool. Soc. 1882, p. 245, pl. 12, fig. 4, 4a, ♂. de Nicéville, l.c. p. 192 (1890).

*Tarucus calinara*, Butler, Ann. Mag. Nat. Hist. 1886, p. 185, and 1888, p. 147. de Nicéville, l.c. p. 191 (1890).

*Tarucus extricatus*, Butler, Proc. Zool. Soc. 1886, p. 366, pl. 35, fig. 2, ♂. Butler, Ann. Mag. Nat. Hist. 1888, p. 147. de Nicéville, l.c. p. 192 (1890).

Wet-season Brood (Figs. 1, ♂, 1a, ♀, 1b, ♂).

IMAGO.—Male. Upperside pale greyish-purple, a mauve colour; the markings of the underside showing through the wings; outer marginal lines thickly black, with the black colour running inwards shortly on the veins, some black anteciliary spots on the hindwing; cilia of both wings white, with a black basal band. Underside greyish-white, nearly white; markings black. *Forewing* with a streak from the costa a little before the middle to the hinder margin, near the base and continued across the base of the hindwing; a somewhat oblique and rather sinuous transverse streak a little before the middle and not reaching the costa; a streak from near the costa, close to the other streak, runs obliquely outwards to the hinder marginal fourth, and is disconnected in its middle; three spots in a triangle in the upper disc; a post-discal thin band, which curves inwards below the costa; a sub-terminal thinner band, both more or less divided by the veins and a thick marginal line. *Hindwing* with a sub-basal oblique band not reaching the costa, followed by three bands of disconnected short streaks, a post-discal band like that on the forewing, a sub-terminal series of spots shining with blue metallic scales and a terminal line; tails black, tipped with white.

Female. Upperside rather duller in colour, the markings of the underside more plainly visible than they are in the male. *Forewing* with some white in the upper disc; a brown spot at the end of the cell, a discal band of brown spots, followed by a brownish complete band, a sub-terminal brown band and a black marginal line. *Hindwing* with ante-medial, medial and post-medial brownish bands, a sub-terminal series of white lunular marks on a brownish ground, a black terminal line, and between them a series of black spots, increasing in size hindwards, and a white anteciliary row of thin lunules. Underside as in the male.

Expanse of wings, ♂ ♀  $1\frac{1}{10}$  inches.

## Dry-season Brood (Figs. 1c, ♂, 1d, ♀, 1e, ♀).

Male. Upperside similar to the Wet-season form. Underside. *Forewing* with the inner markings similar, the two outer bands composed of spots, those nearest the margin being small and well separated from each other. *Hindwing* with all the bands and markings composed of well separated spots.

Female. Upperside with the general colour much paler, the upper disc of forewing broadly white, in some examples the ground colour of the outer half of the inner space is all white, and the hindwing is also more or less white on the outer portion, the base of both wings with blue iridescent scales. Underside as in the male.

Expanse of wings, ♂ ♀ 1 inch.

## Extreme Dry-season Brood (Figs. 1f, ♂, 1g, ♀, 1h, ♂).

Male and Female. Upperside as in the other forms. Underside with the outer markings of the forewing and all the markings of the hindwing obsolescent, in some examples the markings of the hindwing are almost obliterated.

Expanse of wings, ♂ ♀  $\frac{8}{10}$  to  $\frac{9}{10}$  inch.

EGG.—Pale apple-green with porcelain-white ridges and tubercles, the ridges arranged in lines parallel to or concentric with the equator, the tubercles arranged meridionally in curved lines, so that the tubercles, when the egg is viewed from above, form a figure like a star of many rays all curved similarly and in the same direction. The tubercles appear very conspicuous under a microscope, and are blunt conical, in size they are equal in diameter about to the intervals between them. The egg is very much flattened and with a wide depression at its apex, it has in fact much the proportions of an Echinoid of the genus *Diadema*.

LARVA.—Just half an inch in length, when full-grown, much flattened, the head pale ochreous and completely hidden under the second segment, which is somewhat wide, the third and fourth segments progressively a little wider, whence the body very gradually tapers to the last segment, which is about as wide as the second. Colour pale green, the whole upper surface covered with a shagreening of small white tubercles, which under a magnifying glass give it a frosted appearance; along the lateral edge of the body and round the anal segment there are numerous somewhat long whitish hairs. From the third to the anal segment there is a somewhat broad (slightly decreasing in width posteriorly) yellowish-green dorsal stripe, which bears a red stripe in its middle decreasingly on the first four segments on which it appears; in some specimens the dorsal stripe is marked with reddish on both sides, which colour is very conspicuous on the twelfth and thirteenth segments. There is also a sub-dorsal series of small spots from the third to the eleventh segments inclusive, which are quite inconspicuous in some specimens. The extensile organs on the twelfth segment are

small. The constrictions between the segments slight and inconspicuous. Feeds on *Zizyphus jujuba* and *Zizyphus vulgaris*. Dr. A. Forel, of Geneva, identifies the ants which attend these larvæ as *Componotus rubripes*, Drury, sub-species *Compressus*, Fabricius, and *Pheidole latinota*, Roger.

PUPA.—Of the usual Lycaenid shape; head, thorax and wing cases green, speckled thickly with black, abdomen green. There is an indistinct black dorsal line extending down the whole length of the body, with a double sub-dorsal series of indistinct black specks; the head is rounded, the thorax slightly humped, the pupa throughout quite smooth.

Mrs. Wylie says the ants attend the caterpillars until they are full-grown, when the ants drive them down the stem of the tree which they have hitherto inhabited, into a temporary nest the ants have set up at the foot of the tree, where on opening the nest "you will see some hundreds of larvæ and pupæ in all stages of development arranged in a broad and even band all round the trunk, and lightly covered with earth." The perfect insects emerge in this nest, and, after drying their wings, are allowed to fly away unmolested (de Nicéville).

HABITAT.—India, Burma, Ceylon, Beluchistan, Persia, Arabia and Africa. A common species.

#### TARUCUS VENOSUS.

Plate 633, figs. 2, ♂, 2a, ♀, 2b, ♂.

*Tarucus venosus*, Moore, Proc. Zool. Soc. 1882, p. 245, pl. 12, fig. 6, 6a, ♂. Doherty, Journ. As. Soc. Bengal, 1886, p. 132. Butler, Ann. Mag. Nat. Hist. 1888, p. 147. de Nicéville, Butt. of India, iii. p. 193, pl. 27, fig. 189, ♂ (1890). Bingham, Fauna of Brit. India, Butt. ii. p. 419 (1907).

IMAGO.—Male. Upperside coloured like *T. theophrastus*, but of a darker purple. *Forewing* with a rather conspicuous black linear mark at the end of the cell, with a rather broad outer marginal brownish-shaded band. *Hindwing* with a similar black bar at the end of the cell, and with a terminal band as in the forewing, but narrower. Underside as in the Wet-season form of *Theophrastus*, but all the streaks and spots larger.

Female. Upperside coloured like the male, the markings as in the female of the Wet-season form of *Theophrastus*, but the subterminal row of white lunules on the hind-wing is wanting. Underside as in the male.

Expanse of wings, ♂ 2  $1\frac{2}{5}$  inches.

HABITAT.—North-Western India.

DISTRIBUTION.—Recorded by de Nicéville from Dharmsala, Kala Pani, Bagheswar, Sarju Valley, Kali Valley, 2,400 feet, Kumaon; we have it from Kulu, and it is in the B. M. also from Kangra, Sultanpore, and Gurais Valley.

## ALLIED INDO-MALAYAN SPECIES.

*Tarucus fasciatus*, Rober, Iris, 1884, p. 194, pl. 9, fig. 15. Habitat, Bankei.  
*Tarucus clathratus*, Holland, Proc. Boston Soc. xxv. p. 71, pl. 5, fig. 8, ♂ (1891). Habitat, Celebes.  
*Tarucus waterstradti*, H. H. Druce, Proc. Zool. Soc. 1895, p. 585, pl. 32, fig. 21. Habitat, Borneo.  
*Tarucus fluvialis*, Grose-Smith, Nov. Zool. ii. p. 511 (1895). Habitat, South Celebes.

## Genus ZIZERA.

*Zizera*, Moore, Lep. Ceylon, i. p. 78 (1881). Distant, Rhop. Malayana, p. 212 (1884). de Nicéville, Butt. of India, iii. p. 110 (1890). Bingham, Fauna of Brit. India, Butt. ii. p. 355 (1907).

**IMAGO.**—Eyes naked; antennae less than half the length of the costa of forewing, club elongate, concave on the underside, palpi sub-porrect, long, thickly fringed in front with stiff hairs, third joint about three-fourths the length of the second, body and legs robust. *Forewing*, costa arched, apex more or less blunt, outer margin convex, hinder angle obtuse, hinder margin slightly sinuate, about three-fourths the length of the costa, the outer margin consequently short; first sub-costal nervure strongly bowed upwards a little beyond its origin and touching the costal nervure, the latter at the point of junction is slightly bowed downwards, second sub-costal given off midway between the bases of the first sub-costal and upper discocellular, third sub-costal given off at less than half the distance between the apex of the cell and of the wing, reaching the costa long before the apex of the wing, sub-costal nervure terminating at the apex, middle discocellular nervule slightly outwardly oblique, concave, lower discocellular as long as the middle, concave, slightly inwardly oblique, hardly differs in venation from the genus *Lycænopsis*, but the second median nervule is given off at, instead of before, the lower end of the cell, as in that genus, the species of the genus *Zizera* has, however, a very distinct facies of their own, some of them are the smallest of butterflies.

**LARVA.**—Green onisciform, the upper portion of the body finely shagreened or covered with short tubercles emitting colourless hairs, no prominent markings.

**PUPA.**—Pale green, of the usual Lycænid form, finely hairy (de Nicéville).

**TYPE.**—*Zizera maha*, Kollar.

Moore quotes *Alsus* as the type, but he described the structure of *Maha*, believing that the European *Alsus* (which belongs to the genus *Cupido*) was congeneric; *Alsus* was not represented in his collection.

## ZIZERA MAHA.

Plate 634, figs. 3, ♂, 3a, ♀, 3b, ♂ (Wet-season Brood), 3c, ♂, 3d, ♀ (Dry-season Brood).

*Lycæna maha*, Kollar, Hugel's Kaschmir, iv. (2), p. 422 (1848). Manders, Trans. Ent. Soc. 1890, p. 528.

*Zizera maha*, Moore, Proc. Zool. Soc. 1882, p. 248. Swinhoe, Proc. Zool. Soc. 1886, p. 426. Doherty, Journ. As. Soc. Bengal, 1886, p. 133. Butler, Ann. Mag. Nat. Hist. 1888, p. 148. de Nicéville, Butt. of India, iii. p. 112, pl. 26, fig. 172, ♂ (1890). Butler, Proc. Zool. Soc. 1900, p. 106. Betham, Journ. Bo. Nat. Hist. Soc. 1891, p. 177. Elwes, Proc. Zool. Soc. 1892, p. 623. Swinhoe, Trans. Ent. Soc. 1893, p. 295. Leslie and Evans, Journ. Bo. Nat. Hist. Soc. 1893, p. 673. Watson, id. 1897, p. 659. Mackinnon and de Nicéville, id. 1898, p. 380. de Rhé-Philipe, id. 1902, p. 487. Bingham (part), Fauna of Brit. India, Butt. ii. p. 355, pl. 19, figs. 136, ♂ 137, ♀ (Dry-season Brood) (1907).

*Polyommatus chandala*, Moore, Proc. Zool. Soc. 1865, p. 504, pl. 31, fig. 5, ♂, and 1874, p. 272:

*Zizera chandala*, Swinhoe, Proc. Zool. Soc. 1886, p. 426. de Nicéville, Butt. of India, iii. p. 114 (1890).

*Lycæna diluta*, Felder, Reise, Nov. Lep. ii. p. 280, pl. 35, figs. 12, 13, ♂ (1865).

*Zizera diluta*, Rothney, Ent. Mo. Mag. xix. p. 35 (1882). de Nicéville, Journ. As. Soc. Bengal, 1885, p. 46. Butler, Proc. Zool. Soc. 1886, p. 367; id. Ann. Mag. Nat. Hist. 1888, p. 149. Wood-Mason and de Nicéville, Journ. As. Soc. Bengal, 1886, p. 365. de Nicéville, Butt. of India, iii. p. 114 (1890).

*Lycæna squalida*, Butler, Trans. Ent. Soc. 1879, p. 4.

*Zizera squalida*, Butler, Ann. Mag. Nat. Hist. 1888, p. 148. de Nicéville, Butt. of India, iii. p. 115 (1890).

#### Wet-season Brood (Figs. 3, ♂, 3a, ♀, 3b, ♂).

IMAGO.—Male. Upperside dark greyish-blue. *Forewing* with broad blackish-brown outer marginal border, darkest on the margin and paling inwardly. *Hindwing* with the costa broadly suffused with pale blackish-brown, the outer marginal border similar to that on the forewing. Underside pale brownish-grey, markings blackish-brown, edged with whitish. *Forewing* with a lunular mark at the end of the cell, a spot in the middle of the cell, a discal curved row of spots, the first from the lower end, sometimes more or less linear, the second oblique and a little inwards. *Hindwing* with a sub-basal series of four spots almost in a line, the lowest one being the end spot of a curved discal row of spots, that and the third spot of the discal row being placed a little inwards, both wings with a sub-terminal double row of lunular marks and a terminal black line. Cilia whitish. Antennæ black, ringed with white, head and body blackish above, white below.

Female. Upperside of a uniform blackish-brown without any markings. Underside as in the male, markings more prominent.

Expanse of wings, ♂ ♀  $1\frac{1}{10}$  inches.

#### Dry-season Brood (Figs. 3c, ♂, 3d, ♀).

Male. Upperside silvery light blue, with some bright blue basal irrations, costal and marginal lines on both wings black; no other markings. Underside with the ground colour darker than in the Wet-season form, the markings similarly disposed, but all very obscure, except the cell spots and discal row of spots on the forewing.

Female, like the male, but the ground colour above is darker and duller, and both wings have broad, suffused, brownish outer marginal bands; on the underside the markings are like those of the male of the Wet-season form.

Expanse of wings, ♂ ♀ 1 inch.

Photo of *Z. maha*.—As compared with *Z. ossa*, the dorsal processes are slighter. The clasps are much more slender, especially basally, longer, viz., 1·00 mm., and attached to each other to a higher level. The terminal teeth have two nearly equal large teeth, well separated; there are always one or more small teeth along the distal margin (Chapman).

**LARVA.**—When full-grown about 0·4 of an inch in length, green, onisciform, with a dorsal line of a darker green than the ground, the entire upper surface shagreened, the minute whitish tubercles giving out very fine short colourless hairs. No distinctive markings whatever. Head smooth, black, shining as usual. Feeds in Calcutta on *Oxalis corniculata*, Linnæus.

**PUPA.**—Very pale green, attached to the underside of the leaves of the food plant; finely hairy, without markings, of the usual Lycaenid shape (de Nicéville).

**HABITAT.**—Northern India, North Burma.

**DISTRIBUTION.**—Elwes records it from the Naga and Karen Hills, Watson from the Chin Hills, Mackinnon from Mussuri, de Rhé-Philippe from Lucknow, Leslie and Evans from Chitral, Mauds from the Shan States, Betham from Pachmari; it is in our collection from Ranchi, Mhow, Kulu and the Khasia Hills; and in the B. M. from Hassan Abdul, Campbellpur, Rawul Pindi, Chittar Pahar, Akhor, Deval, Buguster, Murree, Nander, Sikkim, Cachar and Calcutta.

#### ZIZERA OSSA.

Plate 635, figs. 1, ♂, 1a, ♀, 1b, ♂ (Wet-season Brood), 1c, ♂, 1d, ♀ (Dry-season Brood).

*Zizera ossa*, Swinhoe, Proc. Zool. Soc. 1885, p. 132, pl. 9, figs. 11, ♂, 12, ♀. de Nicéville, Butt. of India, iii. p. 115 (1890). Watson, Journ. Bo. Nat. Hist. Soc. 1890, p. 34.

*Zizera maha*, Aitken and Comber (nec Kollar), Journ. Bo. Nat. Hist. Soc. 1903, vol. xv. p. 43. Bingham (part), Fauna of Brit. India, Butt. ii. p. 355 (1907).

Wet-season Brood (Figs. 1, ♂, 1a, ♀, 1b, ♂).

**IMAGO.**—Male. Upperside of a uniform pale grey-blue, with the exception of the basal area where there are some dark blue scales. *Forewing* with the costal line black, apex narrowly black, fining down to a fine marginal line towards the hinder angle.



*Hindwing* with a fine outer marginal black line. Underside much as in *Zizera maha*, the spots smaller, the ground colour darker.

Female. Upperside paler and duller in colour. *Forewing* with a diffuse blackish border, very broad. *Hindwing* with the costal and marginal areas slightly suffused with pale blackish. Underside as in the male. Cilia grey, brownish on the upper part of the forewing. Antennae black, ringed with white; head and body dark, with blue reflections above; grey beneath, abdomen beneath white.

Expanse of wings, ♂ ♀ 1 inch.

Dry-season Brood (Figs. 1c, ♂, 1d, ♀).

Male and Female. Upperside pale lavender-grey, both wings with very fine terminal black lines, more pronounced in the female, which has a slight thickening at the apex of forewing, and indications of a greyish sub-terminal, shaded thin band. Underside with the markings disposed as in the other form, but minute, and on the hindwing obscure.

Expanse of wings, ♂ ♀  $\frac{9}{10}$  inch.

Photo of *Z. ossa*.—The whole appendages are rather smaller, dorsal process fuller, clasps shorter 0.83 mm. (against 1.00 in *Z. maha*). The base of the clasp is wider, giving a flask shape (= body, neck and head), as compared with the more cylindrical form in *Maha*. They are united together proportionately higher up. Assuming two terminal teeth as in *Maha*, then the upper one is very short and clearly adpressed to the lower, forming merely a notch on its upper margin, beyond this there are no small teeth on the distal margin. The distal margin may be straight or recessed as in photo (Chapman).



HABITAT.—Southern India.

DISTRIBUTION.—Recorded by Aitken and Comber from the Konkan, by Watson from Mysore; it is in our collection from Poona, Bombay, Bangalore, Anamalli Hills, Mahableshwur, Ahmednagar; and in the B. M. also from Kolar, Ootacamund and Durbunga.

#### ZIZERA GAIKA.

Plate 635, figs. 2, ♂, 2a, ♀, 2b, ♂ (Wet-season Brood), 2c, ♂, 2d, ♀ (Dry-season Brood).

*Lycaena gaika*, Trimen, Trans. Ent. Soc. 1862, p. 403; id. South Afr. Butt. ii. p. 50 (1887).

*Zizera gaika*, Butler, Proc. Zool. Soc. 1884, p. 484. de Nicéville, Butt. of India, iii, p. 118, pl. 26, fig. 174, ♀ (1890). Manders, Trans. Ent. Soc. 1890, p. 528. Watson, Journ. Bo. Nat. Hist. Soc. 1891, p. 44. Betham, id. p. 177. Watson, id. 1897, p. 659. Mackinnon and de Nicéville,

id. 1898, p. 380. Aitken and Comber, id. 1903 (vol. xv.), p. 47. Davidson, Bell and Aitken, id. 1896, p. 374. Bingham, Fauna of Brit. India, Butt. ii. p. 359 (1907).

*Lycaena pygmæa*, Snellen, Tijd. voor Ent. xix. p. 163, pl. 7, fig. 3 (1876).

*Zizera pygmæa*, Moore, Lep. Ceylon, i. p. 79, pl. 35, figs. 5, 5a, ♂ (1881); id. Proc. Zool. Soc. 1882, p. 245. Butler, id. 1883, p. 149. Swinhoe, id. 1884, p. 507, 1885, p. 132, and 1886, p. 427. Moore, Journ. Linn. Soc. Lond. Zool. xxi. p. 30 (1886). Doherty, Journ. As. Soc. Bengal, 1886, p. 133. Distant, Rhop. Malayana, p. 454 (wood-cut), ♂ (1886). Watson, Journ. Bo. Nat. Hist. Soc. 1890, p. 34.

Wet-season Brood (Figs. 2, ♂, 2a, ♀, 2b, ♂).

IMAGO.—Male. Upperside dark violet-blue, with bright reflections in certain lights; a fine black costal line on the forewing, and thicker marginal black line on both wings, with a sub-terminal narrow, shaded, brownish band. Cilia white, with some pale brownish marks on the forewing. Underside grey, markings black, edged with white. *Forewing* with a lunular mark at the end of the cell, a whorl of small black spots, commencing near the costa at its middle, another above the cell mark, two close together, and then curving round and across the disc in a regular row, the discal spots being more or less oblique, the second from the hinder margin more inwards than the others. *Hindwing* with three sub-basal spots, a lunular mark at the end of the cell and a complete discal curve of small spots, the second from the upper end and the third from the lower end more inward than the others. Cilia white, grey at the base and at the tips. Antennæ black, ringed with white; head and body blackish above, greyish-white beneath.

Female. Upperside brown, marginal lines black. Underside similar to that of the male, the ground colour generally a little darker and the markings more prominent.

Expanse of wings, ♂  $\frac{9}{10}$  inch.

Dry-season Brood (Figs. 2c, ♂, 2d, ♀).

Male. Upperside of a paler blue, much paler and more violet in colour; costal line of forewing and marginal line of both wings very finely black. Underside white, the markings very minute.

Female. Upperside darker than the male, shaded with brown. Underside slightly darker, with the markings a little more prominent.

Expanse of wings, ♂  $\frac{7}{10}$  to  $\frac{8}{10}$  inch.

LARVA.—Fed on the flowers of *Nelsonia*; of the usual woodlouse form, but narrower than *Lysimon*; segments well marked and covered with dense black bristles; colour transparent green, with a sub-dorsal white stripe and a red dorsal blotch on each segment.

PUPA.—Green, very slender, thickest in the centre, anal end very narrow, rounded;

thorax only slightly humped, covered with thin, longish, white hairs (Davidson, Bell and Aitken).

HABITAT.—India, Ceylon, Burma, the Malayan sub-region to Java and Sumatra, also in Arabia and Africa.

DISTRIBUTION.—Watson records it from Mysore, the Chin Hills and Chin Lushai, Mackinnon from Mussuri, Manders from the Shan States, Moore from Ceylon and Mergui, Doherty from Kumaun, de Nicéville from Simla, Malda, Sikkim, Orissa, Nilgiris, Andamans and Rangoon; we took it at Aden and Karachi, and have received it from the Khasia Hills; it seems to be generally distributed, but is never a common species.

#### ZIZERA LYSIMON.

Plate 635, figs. 3, ♂, 3a, ♀, 3b, ♂ (Wet-season Brood), 3c, ♂, 3d, ♀ (Dry-season Brood).

*Papilio lysimon*, Hübner, Eur. Schmett. i. pl. 105, figs. 534, 535, ♂ (1798–1803).

*Polyommatus lysimon*, Godart, Enc. Méth. ix. p. 701 (1823).

*Lycæna lysimon*, Herrich-Schäffer, Schmett. Eur. i. p. 118, pl. 5, figs. 28, 29, ♂ ♀ (1843).

Westwood, Gen. Diurn. Lep. ii. p. 492 (1852). Staudinger, Hor. Soc. Ent. Ross. xiv. p. 239 (1878). Elwes, Proc. Zool. Soc. 1881, p. 888. Lang, Butt. of Europe, p. 111, pl. 24, fig. 3, ♂ ♀ (1884). Trimen, South Afr. Butt. p. 45 (1887).

*Plebeius lysimon*, Kheil, Rhop. Ins. Nias, p. 30 (1884).

*Zizera lysimon*, de Nicéville, Butt. of India, iii. p. 116, pl. 26, fig. 133, ♀ (1890). Watson, Journ. Bo. Nat. Hist. Soc. 1891, p. 44. Betham, id. p. 177. Leslie and Evans, id. 1903, p. 674. Davidson, Bell and Aitken, id. 1896, p. 373. Mackinnon and de Nicéville, id. 1898, p. 380. Bingham, Fauna of Brit. India, Butt. ii. p. 357 (1907).

*Lycæna galba*, Lederer, Verh. Zool.-bot. Ges. Wien. v. p. 190, pl. i. fig. 4, ♂ (1853).

*Lycæna knysna*, Trimen, Trans. Ent. Soc. 1862, p. 282; id. Rhop. Afr. Aus. ii. p. 255 (1866).

*Zizera knysna*, Butler, Proc. Zool. Soc. 1884, p. 484.

*Polyommatus karsandra*, Moore, Proc. Zool. Soc. 1865, p. 505, pl. 31, fig. 7, ♀. Wood-Mason and de Nicéville, Journ. As. Soc. Bengal, 1881, p. 235.

*Lycæna karsandra*, Felder, Verh. Zool.-bot. Ges. Wien, xviii. p. 282 (1868). Butler, Trans. Linn. Soc. London, Zool. (2), i. p. 548 (1877).

*Zizera karsandra*, Moore, Lep. Ceylon, i. p. 78, pl. 35, figs. 6, 6a, ♂ (1881). Distant, Rhop. Malayana, p. 213, pl. 22, fig. 22, ♂ (1884). Swinhoe, Proc. Zool. Soc. 1884, p. 506; and 1885, p. 132; id. Trans. Ent. Soc. 1885, p. 341. Butler, Proc. Zool. Soc. 1886, p. 367. Swinhoe, id. p. 426. Doherty, Journ. As. Soc. Bengal, 1886, p. 133. de Nicéville, Butt. of India, iii. p. 117 (1890).

*Zizera mora*, Swinhoe, Proc. Zool. Soc. 1884 p. 506, pl. 47, fig. 2. de Nicéville, Butt. of India, iii. p. 118 (1890).

Wet-season Brood (Figs. 3, ♂, 3a, ♀, 3b, ♂).

IMAGO.—Male. Upperside violet-brown. *Forewing* with an indistinct black linear mark at the end of the cell; both wings with the outer marginal line brown,

suffused shortly on its inner side. Underside brownish-grey, markings black, edged with whitish. *Forewing* with a linear mark at the end of the cell, a spot inside the cell, a discal evenly curved series of six spots, a seventh mark, somewhat linear below the lowest spot. *Hindwing* with four sub-basal spots in a line, and a discal curved row of spots, the lowest but one placed a little inwards; both wings with a sub-terminal double row of brownish lunular marks and a brownish marginal line. Cilia white, marked with pale greyish. Antennæ black, ringed with white; head and body brown above, grey beneath.

Female. Like the male above and below.

Expanse of wings, ♂  $\frac{7}{10}$ , ♀ 1 inch.

Dry-season Brood (Figs. 3c, ♂, 3d, ♀).

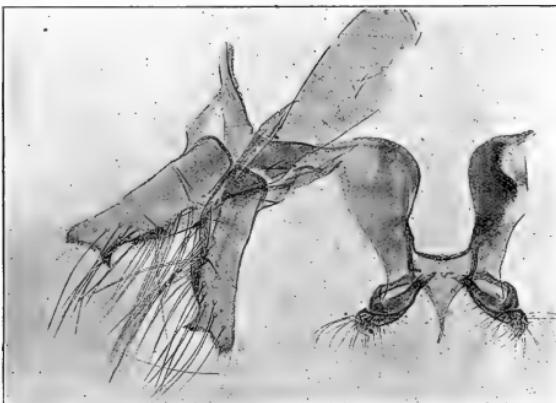
Male and Female, like the other form, but the wings are more transparent; on the upperside the coloration is more violet, and on the underside the markings are small and less defined.

Expanse of wings, ♂  $\frac{7}{10}$ , ♀  $\frac{8}{10}$  to  $\frac{9}{10}$  inch.

Photo of *Z. lysimon* from Egypt, West France, Mergui, Simla.—I find three very distinct forms of the clasps of this species. In one form the end of the clasp slopes, so that the terminal spines are the part furthest from the base. This form I have from Natal, Andalusia, Aden, Sheik Othman (*Knysna*).

Form II. has a deep recess in the middle of the distal margin, so that the terminal spines point in the same direction as in Form I., but the other end of the margin is the furthest from the base. My specimens of this form profess to come from West France, Egypt, Mergui (labelled *Sangra* in Moore's collection) and Simla.

A third form of clasp has the terminal margin at right angles to the line of the haft, a difference from Form I. that is perhaps increased in appearance in the photographs, but is certainly not caused by the attitude of the specimens. This form I have only from Teneriffe.



I think these three forms make geographical races, but I should not like to assert this without examining very many more specimens than I have done (Chapman).

*Zizera mora* appears to be an aberration, in which the discal spots on the underside are lengthened into streaks. Specimens of this kind have been taken occasionally in various parts of India.

**LARVA.**—Feeds on a small vetch (*Zornia diphylla*), is of the usual form, but narrow, and is not attended by ants; it is covered with minute light hairs, colour grass-green, with a lighter marginal line.

**PUPA.**—Of the usual form, narrow, green, with a slightly darker line dorsally, and with brown edges to the wing covers.

**HABITAT.**—Peninsular India, Ceylon, Burma, Nikobars, Central and Western Europe, and parts of Africa.

A very common form, occurring often in great plenty in its favourite localities.

#### ZIZERA OTIS.

Plate 636, figs. 1, ♂, 1a, ♀, 1b, ♂ (Wet-season Brood), 1c, ♂, 1d, ♀ (Dry-season Brood).

*Papilio otis*, Fabricius, Mant. Ins. ii. p. 73 (1787).

*Hesperia otis*, Fabricius, Ent. Syst. iii. p. 296 (1793).

*Lycena otis*, Butler, Cat. Fabr. Lep. B. M. p. 169, pl. ii. figs. 8, 11 (1869).

*Zizera otis*, Butler, Ann. Mag. Nat. Hist. 1886, p. 186. de Nicéville, Butt. of India, iii. p. 119, pl. 26, fig. 175, ♂ (1890); id. Journ. Bo. Nat. Hist. Soc. 1890, p. 385. Watson, id. 1891, p. 44.

Betham, id. p. 178. de Rhé-Philippe, id. 1902, p. 488. Leslie and Evans, id. 1903, p. 674. Aitken and Comber, id. 1903, vol. xv. p. 47. Bingham, Fauna of Brit. India, Butt. ii. p. 360.

*Polyommatus (Cupido) otis*, Westwood, Trans. Ent. Soc. 1888, p. 471.

*Polyommatus sangra*, Moore, Proc. Zool. Soc. 1865, p. 772, pl. 41, fig. 8, ♂.

*Zizera sangra*, de Nicéville, Butt. of India, iii. p. 120 (1890). Manders, Trans. Ent. Soc. 1890, p. 528. Swinhoe, id. 1893, p. 292.

*Lycena indica*, Murray, Trans. Ent. Soc. 1874, p. 525, pl. 10, figs. 2, 3, ♂ ♀.

*Zizera indica*, Moore, Lep. Ceylon, i. p. 79, pl. 35, figs. 7, 7a, ♂ (1881). Hampson, Journ. As. Soc. Bengal, 1888, p. 357. de Nicéville, Butt. of India, iii. p. 121 (1890).

*Lycena lysizone*, Snellen, Tijds. voor Ent. 1876, p. 152, pl. 7, figs. 2, 2a. Butler, Trans. Linn. Soc. Zool. Lond. 1877, p. 548.

*Zizera lysizone*, Distant, Rhop. Malayana, p. 212 (woodcut, part of neuration of forewing), pl. 20, fig. 9, ♂ (1884).

*Zizera dryina*, Chapman, Proc. Ent. Soc. 1908, p. lxxxiv. pl. B, fig. 2.

Wet-season Brood (Figs. 1, ♂, 1a, ♀, 1b, ♂).

**IMAGO.**—Male. Upperside violet-blue. *Forewing* with an outer-marginal band of brownish colour, which is rather broad at the apex and narrows hindwards. *Hindwing* with a broad brownish costal and apical band, which narrows suddenly and leaves the greater part of the outer margin with the terminal line blackish. Cilia white, brownish

at base of forewing and apical portion of hindwing. Underside brownish-grey, markings black, edged with white. *Forewing* with a linear mark at the end of the cell, and a discal series of spots; the posterior two geminate, sometimes absent (= *sangra*), the upper spot placed inwards below the costa and well separated from it; the third spot from the top is more or less oblique; no spot inside the cell. *Hindwing* with four sub-basal spots in a line, farther from the base than usual, and consequently nearer the discal series, which consists of two spots in a line below the costa, and six spots in a curve, a little farther outwards, the second of these from the lower end placed a little inwards; a linear mark at the end of the cell; both wings with a terminal brown line, a sub-terminal series of brown marks enclosed by a line of brownish lunules. *Cilia* dusky. *Antennæ* black, ringed with white; head and body brown above, with a little blue scaling; white underneath.

**Female.** Upperside dark brown, with blue suffusion at the base and sometimes along the abdominal margin; both wings with brown marginal lines. Underside like the male.

Expanse of wings, ♂  $\frac{9}{10}$  inch.

Dry-season Brood (Figs. 1c, ♂, 1d, ♀).

**Male.** Upperside pale violet, both wings with a very fine marginal line, darker than the wing colour. Underside like that of the other form, but the markings more obscure.

**Female.** Upperside brown, tinged with blue, sometimes pale and nearly the colour of the male. Underside like the male, but markings much more prominent.

Expanse of wings, ♂  $\frac{7}{10}$  to  $\frac{8}{10}$  inch.

**LARVA.**—Similar to the larva of *Z. maha*; feeds on *Alysicarpus vaginalis*.

**HABITAT.**—Outer Himalayas, Continental and Peninsular India, Ceylon, Andamans, Nikobars, Burma, China, and the Malayan sub-region; a common species.

**NOTE.**—The clasps in this species are clearly of a not dissimilar structure to those of *Z. gaika*; they are much longer, extending into a neck and head, looking not unlike a leg and foot; they possess a long thick hair, almost as in *gaika*; it is unaccompanied by another one.

In the photograph one of them is missing, and the other has its extremity outside the picture. The figure of the appendages of *Z. drynia* (Ent. Proc. 1908, pl. B, fig. 2) may be referred to. I have now little doubt that



*drynia* is a synonym of *Z. otis*; the appearance and large size of the specimens prevented any suspicion of its being *otis* (Chapman).

#### INDO-MALAYAN, CHINESE AND JAPANESE ALLIED SPECIES.

*Zizera argia*, *Lycæna argia*, Ménétriés, Cat. Mus. Petr. ii. p. 125, pl. 10, fig. 7 (1857). *Synonyms*, *Lycæna japonica*, Murray, Ent. Mo. Mag. 1874, p. 167. *Lycæna alope*, Fenton, Proc. Zool. Soc. 1881, p. 851. *Habitat*, Japan.

*Zizera oriens*, Butler, Ann. Mag. Nat. Hist. 1883, p. 417. *Habitat*, Mindanao.

*Zizera alboceruleus*, Plebeius alboceruleus, Rober, Iris, 1884, p. 59, pl. 4, fig. 7. *Habitat*, Hong Kong.

*Zizera thibetensis*, *Lycæna thibetensis*, Poujade, Ann. Soc. Ent. France, 1885, p. cl. *Habitat*, Western China.

*Zizera marginata*, *Lycæna marginata*, Poujade, l.c.

*Zizera opalina*, *Lycæna opalina*, Poujade, l.c. p. exlii. *Habitat*, Japan.

*Zizera ida*, *Lycæna ida*, Grum, Grshimaïlo, Hor. Ent. Ross. xxv. p. 451 (1891). *Habitat*, Chinese Thibet, Central Asia.

*Zizera similis*, *Polyommatus similis*, Moore, Proc. Zool. Soc. 1878, p. 702. *Habitat*, Hainan.

#### Sub-Family EVERINÆ.

*Eyes* naked. *Forewing* with veins 11 and 12 coinciding for some distance; 5 and 6 not approximate at base (except in the aberrant Genus *Talicada*), 7 ends on costa a little before the apex, 8 absent, 9 from beyond end of cell. *Genitalia* very compact, cingula and tegumen fitting closely over harpagones. Harpago broad, oblong, cleft from the front apical third below the middle; upper front apex produced downwards into a long curved point; lower apex with an upward inclination and a somewhat hollowed spatulate extremity. Cingula or girdle well developed, highly curved, expanding as it nears the tegumen, which is always small and developing more or less into a point at the fore apex of the dorsum. Fakes or hooks very short, broadish at base, often little more than a short point. Furca (i.e. the support or guide to the ædœagus) of slight dimensions. Ædœagus short, of moderate width (Bethune-Baker).

#### Genus EVERES.

*Everes*, Hübner, Verz. bek. Schmett. p. 69 (1816). Moore, Lep. Ceylon, i. p. 85 (1881). Distant, Rhop. Malayana, p. 221 (1884). Seudder, Butt. Exot. United States and Canada, p. 905 (1889). de Nicéville, Butt. of India, iii. p. 136 (1890). Bingham, Fauna of Brit. India, Butt. ii. p. 377 (1907).

*Tongeia*, Tutt, Brit. Butt. x. p. 41 (1908). Type, *fischeri*, Eversmann.

*Binghamia*, Tutt, l.c. p. 42. Type, *parrhasius*, Fabricius.

Eyes of moderate size, naked; head small, clothed with scales and hairs; hairs on both face and head inclined forwards, frons flattish, moderately narrow, very slightly tapering wider to meet the palpi; palpi long, upturned, densely scaled and with longish hairs; end segment long, smooth, slightly depressed; antennæ slender, terminating in a slightly spatulate club. *Forewing*, rather narrow, costa slightly arched, outer margin fully arched. *Hindwing* long, rather narrow, with outer margin very strongly arched; tail fine. *Neuration*. *Forewing*, vein 2 from before the middle of the cell, 3 from before the lower angle, 4 from the angle, 5 from about the middle of the discocellulars, 6 from the upper angle, 7 from before upper end of cell, 8 absent, 9 from middle of 7, 10 from the cell, 11 anastomosing shortly with 12. *Hindwing*, vein 2 from beyond the middle of the cell, 3 and 4 from the lower angle, 5 from the middle of the discocellulars, 7 from well behind the upper angle of the cell; forelegs of male long and slender, tarsus incomplete, as generally obtains in the Lycaenidae; tarsus in female apparently normal, mid pair of moderate length; hindlegs no longer than the mid, tibiae with one pair of spurs.

Type, *E. argiades*, Pallas.

#### EVERES ARGIADES.

Plate 636, figs. 2 ♂, 2a, ♀, 2b, ♂.

*Papilio argiades*, Pallas, Reise, i. App. p. 472 (1771).

*Lycaena argiades*, Elwes, Proc. Zool. Soc. 1881, p. 887. Lang, Butt. of Europe, p. 101, pl. 22, fig. 5, ♂ ♀ (1884). Leech, Proc. Zool. Soc. 1887, p. 415. Pryer, Rhop. Niphon. p. 17, pl. 4, fig. 23 A, ♂, 23 B, ♀ (1888).

*Everes argiades*, de Nicéville (part), Butt. of India, iii. p. 137, pl. 26, fig. 180, ♂ (1890). Bingham (part), Fauna of Brit. India Butt. ii. p. 378, pl. 19, figs. 141, 142, ♂ ♀ (1907). Leslie and Evans, Journ. Bo. Nat. Hist. Soc. 1903, p. 674. Chapman, Trans. Ent. Soc. 1908, p. 373, pl. 19, figs. 1, 2 (genitalia).

*Papilio polypesperchon*, Bergstrasser, Nomencl. ii. p. 72, pl. 44, figs. 3 to 5 (1779). Ochsenheimer, Schmett. Eur. i. (2), p. 61 (1808).

IMAGO.—Male. Upperside dark violet-blue. *Forewing* with a black slender costal line. *Hindwing* with a blackish narrow costal space; both wings with black terminal line, and a series of indistinct blackish sub-terminal spots on the hindwing; tails black tipped with white. Underside greyish-white, spots black. *Forewing* with some sparse pale blue scaling at the base, a slender black lunular mark at the end of the cell, a line of six discal spots, the lower linear, a seventh spot inwards below the costa. *Hindwing* with basal and abdominal portions sparsely irrorated with pale blue scales, three sub-basal spots, a discal whorl of eight spots, the first sub-costal near the apex, the second below it, on the inner side, the third outwards and in a well inturned curve with the

fourth, fifth and sixth, the seventh well outwards, sometimes lunular, sometimes broken into two, the eighth close to the abdominal margin level with the sixth; all the spots on both wings ringed with white; both wings with very slender black terminal line, sub-terminal brown lunules, and between them a series of blackish dots edged with white, the one above the tail and the next upper one black, with the space between the spots and the lunules filled in with orange.

Female. Upperside brown, terminal lines black and very slender. *Hindwing* with two black sub-terminal spots capped with orange above the tail, in some examples a few more spots extending upwards. Underside as in the male, spots more prominent.

Expanse of wings, ♂ 1 $\frac{3}{10}$  inches.

DESCRIPTION OF GENITALIA.—Harpago very broad, with deep incision on the front edge dividing the fore part into two, with their two edges overlapping each other; the lower extremity is produced into a somewhat hollowed, rounded apex (narrowly fan-shaped), the upper portion being highly curved downwards, over the lower apex, in a long, gradually tapering point, whose extremity is finely pointed and suddenly bent outwards nearly at right angles to its main stem, the cingula or girdle is broad, well curved at a third over the harpagones, showing a distinct juncture with the unusually small tegumen, which is triangular in shape, ending in a short but definite point, the falces are reduced to a short pyramidal point, not being hooked, the furca rising at the lower part of the harpago, at its centre, is bent slightly forward at the base, waved, erect and fairly broad in its arms, the penis sheath is fairly broad and long, very gradually tapering to its extremity. The harpago is well supplied with long bristles at its front edge; the bristles in the tegumen being short and finer (Bethune-Baker).

HABITAT.—N.W. Himalayas.

DISTRIBUTION.—Simla, Kulu, Campbellpur, Kumaun and the Khasia Hills (Bethune-Baker's notes).

NOTE.—Of all the different species placed as synonyms under *argiades* by de Nicéville, *polysperchon* appears to be the only one that can remain; it is said to be the second generation of *argiades*, and is a good form.

#### EVERES DIPORIDES.

Plate 636, figs. 3, ♂, 3a, ♀, 3b, ♂.

*Everes diporides*, Chapman, Proc. Ent. Soc. 1908, p. lxxxii. Pl. C, fig. 2 (genitalia).

IMAGO.—Male. Upperside dark grey-blue, veins black and rather prominent. *Forewing* with a blackish spot at the end of the cell, and a broad, even, blackish band. *Hindwing* with the costal space blackish, the colour running round the apex and down the outer margin, being diffuse hindwards, with two blackish spots above the tail,

which is black tipped with white; marginal line black; cilia white with a grey band in it. Underside grey, spots black ringed with white. *Forewing* with a linear mark at the end of the cell, a discal row of six spots, the upper one a little inwards, the lowest one linear; terminal line black, a row of rather large subterminal brown spots, which become obsolete upwards, and between them an obscure row of smaller spots. *Hindwing* with two sub-basal spots, a discal whorl of nine spots, the upper one near the apex, the second below it, the next four, commencing a little outwards, are in a slight curve inwards, the next two geminate and placed outside, the last close to the abdominal margin; terminal line black, the sub-terminal series of lunules sinuous, brown on the upper and lower ends, between them a series of spots, the two above the tail large and black, heavily capped with orange, edged inwardly with black lunules, with a little white on their inner sides, these lunules forming the inner curve in the sub-terminal series.

Female. Upperside blackish-brown without any markings. Underside as in the male, the ground colour darker. Antennæ black, ringed with white; head and body black above, white beneath.

Expanse of wings, ♂ ♀  $1\frac{2}{5}$  inches.

HABITAT.—N.W. Himalayas.

There are two pairs from Mandi in the B. M.

#### EVERES PARRHASIUS.

Plate 637, figs. 1, ♂, 1a, ♀, 1b, ♂, 1c, ♀ (Wet-season Brood), 1d, ♂, 1e, ♀ (Dry-season Brood).  
*Heesperia parrhasius*, Fabricius, Ent. Syst. iii. (i.) p. 289 (1793).  
*Papilio parrhasius*, Donovan, Ins. Ind. pl. 14, fig. 5, ♂ (1800).  
*Polyommatus parrhasius*, Godart, Enc. Méth. ix. p. 657 (1823).  
*Lyceena parrhasius*, Horsfield, Cap. Lep. E.I.C. p. 86 (1829). Horsfield and Moore, Cat. Lep. Mus. E.I.C. i. p. 22, pl. 1a, fig. 3, ♂ (1857).  
*Lampides parrhasius*, Butler, Cat. Fabr. Lep. B. M. p. 165 (1869). Semper, Journ. des Mus. Godef. xiv. p. 155 (1879).  
*Cupido parrhasius*, Snellen, Tijd. voor Ent. xxi. p. 19 (1878).  
*Everes parrhasius*, Moore, Lep. Ceylon, i. p. 85, pl. 36, fig. 7 (1881). Distant, Rhop. Malayana, p. 221 (woodcut ♂) (1884). Hampson, Journ. As. Soc. Bengal, 1888, p. 357. Watson, Journ. Bo. Nat. Hist. Soc. 1890, p. 34. Chapman, Trans. Ent. Soc. 1908, p. 373, pl. 20, fig. 8 (genitalia).  
*Everes argiades*, de Nicéville (part), Butt. of India, iii. p. 137 (1890). Manders (ne Pallas), Trans. Ent. Soc. 1890, p. 528. Watson, Journ. Bo. Nat. Hist. Soc. 1891, p. 45. Betham, id. p. 178. Swinhoe, Trans. Ent. Soc. 1893, p. 296. Watson, Journ. Bo. Nat. Hist. Soc. 1897, p. 660. Mackinnon and de Nicéville, id. 1898, p. 380. de Rhé-Philipe, id. 1908, p. 885. Bingham (part), Fauna of Brit. India, Butt. ii. p. 378 (1907).

Wet-season Brood (Figs. 1, ♂, 1a, ♀, 1b, ♂, 1c ♀).

IMAGO.—Male. Upperside dark greyish-blue, with a lilacine tint. *Forewing* with a black terminal band broadening slightly towards the apex. *Hindwing* with the costal

margin broadly blackish; the outer margin with a narrow black band, the upper portion composed of a series of spots joined together, inwardly pale-edged; and often with black marks running shortly up the veins, two large jet black spots in interspaces 2 and 3, and two minute black spots at the anal angle, all capped more or less with orange. Tails black tipped with white. Cilia of forewing grey, of hindwing white with black points at the vein ends. Underside greyish-white, all the markings white-edged. *Forewing* with a lunular mark at the end of the cell, a discal row of six lunular marks in line, the upper one a little inwards. *Hindwing* with three sub-basal small black spots, the middle one well inwards, and another similar spot, sub-apical close to the *costa*; a slender mark at the end of the cell, and a discal row of six lunular marks, the upper one inwards, just below the sub-apical black spot, the lowest mark also well inwards, the others in a gentle outward curve; the discal row on both wings well separated from the marginal series; both wings with a terminal brownish line and sub-terminal series of marks, lunular in the hindwings and between them a row of brownish spots, the two spots in interspaces 2 and 3, and sometimes another in interspace 4 black and large with some metallic specks and capped with obscure orange. Antennæ black, ringed with white, head and body blackish above, with blue pubescence, white beneath.

Female. Upperside paler than the male, the blackish bands on both wings much broader; blackish lunular line generally present at the end of the cell on both wings. Underside more white than the male, the discal series similarly well separated from the marginal series in both wings, the lunular marks composing them darker and more prominent.

Expanse of wings, ♂ ♀ 1 to  $1\frac{1}{10}$  inches.

Dry-season Brood (Figs. 1d, ♂, 1e, ♀).

Male and Female. Upperside pale lilacine greyish-blue; veins more or less prominent, the terminal bands narrower and much paler, the black spots capped with orange on the hindwing, small and generally present in both sexes. Underside with the markings similar to those of the Wet-season form, but very minute and indistinct.

Expanse of wings, ♂ ♀  $1\frac{8}{10}$  to  $1\frac{9}{10}$  inch.

DESCRIPTION OF GENITALIA.—*Harpago* decidedly narrower than in *E. argiades*, with the frontal incision of about the same depth, but the lower extremity is not of a rounded form, but is much straighter and sub-serrate, the upper long overlapping point is narrower, less curved, and ending in a much finer point which is evenly curved, not sharply so as in *E. argiades*, the tegumen is broader, the pointed apex being shorter with the fæces slightly hooked; the penis sheath is much shorter, narrower and terminating more finely in proportion to its size (Bethune-Baker).

HABITAT.—Southern India, Ceylon.

DISTRIBUTION.—We have it from Ceylon, Hampson records it from the Nilgiris, and there are two examples in the B. M. from that locality. Watson records it from Mysore, and we have taken examples at Bombay.

#### EVERES DIPORA.

Plate 637, figs. 2, ♂, 2a, ♀, 2b, ♂.

*Lycæna dipora*, Moore, Proc. Zool. Soc. 1865, p. 506, pl. 31, fig. 8, ♂.

*Everes dipora*, Doherty, Journ. As. Soc. Bengal, 1886, p. 132. Chapman, Proc. Ent. Soc. 1908, p. lxxxii. pl. C, fig. 1 (genitalia).

*Everes argiades*, de Nicéville (part), Butt. of India, iii. p. 137 (1890). Bingham (part), Fauna of Brit. India, Butt. ii. p. 378 (1907).

IMAGO.—Male. Upperside dark greyish-purplish blue. *Forewing* with or without a blackish spot at the end of the cell; a rather broad black terminal band, with the black colour running up the veins. *Hindwing* with a much narrower terminal band, some blackish costal suffusion and sub-terminal blackish spots edged outwardly by a very slender white line, the spots capped with grey, sometimes with obscure orange, inwardly edged with slender blackish lunules, tail black tipped with white. Cilia on both wings, white with a grey medial line and black points at the ends of the veins. Underside grey with a very slight pinkish tinge, all the spots on both wings black ringed with white. *Forewing* with a lunular mark at the end of the cell, a discal series of short, thick linear marks, the upper two and lowest two placed inwards, followed by an outwardly curved row of brown spots, the lower end of the row nearly touching the lower end of the discal series, a terminal black line. *Hindwing* with two sub-basal spots, a discal series of spots, the two upper ones well inwards, then four in a line, the seventh inwards, the eighth linear, the ninth in a line with the four middle spots; a sub-terminal series of spots and between these and the discal series there is a series of brown spots covered by a broad and bright orange band on the lower portion of the wing, extending more upwards in some examples than in others, a black terminal line.

Female. Upperside blackish-brown, terminal line black, cilia as in the male, some small black sub-terminal lunules on the hindwing, decreasing in size and paling in colour upwards, the lowest two capped with orange, the others with grey. Underside as in the male.

Expanse of wings, ♂ ♀  $\frac{9}{10}$  to 1 inch.

DESCRIPTION OF GENITALIA.—Harpago decidedly narrower than in *E. dipora*, with the lower extremity gradually tapering into a blunt point, the upper portion being decidedly shorter and reduced into a very narrow, overlapping, bluntly pointed finger whose curve is near the base of the incision, so that it overlaps the lower part sooner. The cingula is much narrower and more weakly developed, whilst the tegumen is

rather broader and more bluntly terminated, the falces being very decidedly angled ; the furca rises close to the base of the harpago, not at the centre. The penis sheath is short, quite narrow and tapering to its extremity, especially so far as the apical third (Bethune-Baker).

HABITAT.—N.W. Himalayas, Assam.

DISTRIBUTION.—The type came from Kasaoli ; Doherty records it from Kumaon ; it is in the B. M. from the Scinde Valley, and we have it from the Khasia Hills.

#### EVERES KALA.

Plate 637, figs. 3, ♂, 3a, ♀, 3b, ♂.

*Everes kala*, de Nicéville, Butt. of India, iii. p. 139, pl. 26, fig. 181 (1890). Swinhoe, Trans. Ent. Soc. 1893, p. 297. Bingham, Fauna of Brit. India, Butt. ii. p. 380 (1907).

IMAGO.—Male. Upperside brownish-black with a purplish tint. *Forewing* with a slender terminal line and dusky brown cilia. *Hindwing* with a slender terminal black line and some indistinct blackish sub-terminal spots or marks surrounded with greyish, hardly visible except under the lens ; cilia white with brownish spots. Underside dark steel-grey, markings black edged with whitish. *Forewing* with a lunule at the end of the cell, a discal irregular series of six spots, the first, third and fifth from the top placed inwards, the fifth oblique, the first three round, the others linear, a seventh indistinct, smaller sub-costal spot, inside of and nearly level with the uppermost spot. *Hindwing* with four sub-basal spots, well separated from the base, and decreasing in size hindwards, a lunule at the end of the cell, a sub-apical spot on the costa, another between it and the discoidal lunule, a discal series of six spots rather close together, the second from the upper end linear and transversely placed, the fourth a little inwards ; both wings with slender terminal black line, sub-terminal lunular brown line, with small lunular marks between them. Cilia grey. Antennæ black ringed with white ; head and body black above, white beneath. Tail very short, fine, black tipped with white.

Female, like the male above and below.

Expanse of wings, ♂ ♀  $\frac{8}{10}$  to  $\frac{9}{10}$  inch.

HABITAT.—Khasia Hills.

#### EVERES POTANINI.

Plate 638, figs. 1, ♂, 1a, ♀, 1b, ♂.

*Lycæna potanini*, Alphéraky, Rom. sur Lep. v. p. 104, pl. 5, fig. 4, ♂ (1889).

*Everes potanini*, Leech, Butt. of China, etc. ii. p. 332, pl. 31, fig. 3, ♂ (1892). Bingham, Fauna of Brit. India, Butt. ii. p. 379 (1907).

*Everes umbriel*, Doherty, Journ. As. Soc. Bengal, 1889, p. 433, pl. 23, fig. 1, de Nicéville, Butt. of India, iii. p. 141 (1890).

**IMAGO.**—Male. Upperside black, with a purplish tint, wings thinly clothed, markings of the underside showing through. *Forewing* with a deep black terminal line. Cilia brown, with some white in it on the lower portions. *Hindwing* with a terminal deep black line, the sub-terminal series of the underside plainly visible. Cilia white with blackish spots at the vein ends; a filamentous black tail tipped with white at end of vein 2. Underside dark steel grey, markings dark brown. *Forewing* with a linear mark at the end of the cell, a discal series consisting of two transverse bars in echelon, composed of spots joined together; a terminal blackish line, sub-terminal line of thick short lunular marks, and a series of slender lunular marks between them. *Hindwing* with three sub-basal spots, nearer the base than usual, the first on the costa, the second inside the cell, the third on the abdominal margin, all in a line; a linear mark at the end of the cell, and a discal series of spots joined together and broken into three portions, the lowest portion somewhat inwards; a sub-terminal series of almost angled lunules, enclosing a series of black triangular spots, the lower ones capped with indistinct pale orange; marginal line black with a slender white line between it and the spots. Cilia of both wings white with brownish spots at the vein ends. Antennæ black, ringed with white; head and body black above, white beneath.

Female, like the male above and below.

Expanse of wings, ♂ ♀  $1\frac{1}{10}$  inches.

**HABITAT.**—Burma, Western China.

**DISTRIBUTION.**—Recorded by Doherty from the Tenasserim Valley, by Bingham from the Karen Hills, and by Leech from Eastern Pegu and West China.

#### ALLIED CHINESE SPECIES.

*Everes fischeri*, Lycæna fischeri, Eversmann, Bull. Mosc. iii. p. 537 (1843). Habitat, Corea, China.

*Everes filicaudis*, Lampides filicaudis, Pryer, Cist. Ent. p. 231 (1877). Leech, Butt. of China, etc. ii. p. 331, pl. 31, fig. 6, ♂ (1893). Habitat, China.

*Everes davidi*, Lycæna davidi, Poujade, Ann. Soc. Ent. Fr. 1884, p. cxxxv. Leech, l.c. p. 332, pl. 31, fig. 3, ♂ (1893). Habitat, Moupin.

*Everes moorei*, Lycæna moorei, Leech, Trans. Ent. Soc. 1889, p. 109, pl. 7, fig. 3, id. Butt. of China, etc. ii. p. 310, pl. 34, fig. 9 (1892). Habitat, Central China.

*Everes ion*, Lycæna ion, Leech, Entom. xxiv. Suppl. p. 58 (1891). Habitat, W. China.

*Everes zuthus*, Leech, Butt. of China, etc. ii. p. 330, pl. 31, fig. 7, ♂ (1893).

#### Genus BOTHRINIA.

*Bothria*, Chapman, Proc. Zool. Soc. 1908, p. 677 (præocc.).

*Bothrinia*, Chapman, l.c. 1909, p. 473.

Eyes naked; closely resembling *Cyaniris* in facies, but having the anastomosing sub-costal vein as in *Zizera*; as having the ancillary appendages very different from

*Cyaniris* and *Zizera*. The dorsal portion (tegumen) consists of a central piece, with two horns jointed to it, both of very similar form and structure to those of *Everes* (*Cyaniris* and *Zizera* have the dorsal armature in two lateral portions, the actual dorsum being merely part of the chitinous ring of the ninth abdominal segment with no armature). The claspers have the two processes (characteristic of Lycaenids) of nearly equal size, each being very long and slender, but reminding one a good deal of *Everes*. In *Cyaniris* and *Zizera* the ventral soft (i.e. unarmed with spicules or teeth) process is nearly or quite obsolete (Chapman).

Type, *Chennellii*, de Nicéville.

#### BOTHRINIA CHENNELLII.

Plate 638, figs. 2, ♂, 2a, ♀, 2b, ♂.

*Cyaniris chennellii*, de Nicéville, Journ. As. Soc. Bengal, 1883, p. 72, pl. 1, fig. 10, ♂; id. Butt. of India, iii. p. 102 (1890). Manders, Trans. Ent. Soc. 1890, p. 527. Elwes, Proc. Zool. Soc. 1892, p. 623. Swinhoe, Trans. Ent. Soc. 1893, p. 294. Watson, Journ. Bo. Nat. Hist. Soc. 1897, p. 658. Bingham, Fauna of Brit. India, Butt. ii. p. 327 (1907).

*Bothria chennellii*, Chapman, Proc. Zool. Soc. 1908, p. 677, pl. 38, fig. 1 (ancillary appendages).

*Bothrinia chennellii*, Chapman, l.c. 1909, p. 473.

*Lycaena (Zizera) zera*, Fawcett, Proc. Zool. Soc. 1904, p. 138, pl. 9, fig. 6.

IMAGO.—Male. Upperside lavender-blue. *Forewing* with a broad dusky black outer marginal band fairly uniform in width, except at the apex where it is broader and extends a little on the costa, and a black linear mark at upper end of the cell. *Hindwing* with a very broad blackish band and a narrower marginal band, the latter consisting of a number of blackish spots joined together, and below the spots there is a fine sub-terminal white line; all the veins more or less prominent. Cilia white, grey at the base on the forewing. Underside greyish-white, with a very faint blue tint; markings brown, edged with white. *Forewing* with a linear mark at the end of the cell, a discal even row of short linear marks. *Hindwing* with three sub-costal black spots, a linear mark at end of cell, a discal row of spots, the first and last one black; both wings with a series of sub-terminal lunules, a fine terminal line and between them a series of spots.

Female. Paler in colour. *Forewing*, upperside with a black linear mark at upper end of cell, and broad costal and outer marginal band of a dusky blackish-brown colour. *Hindwing* with the costa broadly brown, a well-marked marginal line and a series of sub-terminal spots; both wings with prominent veins. Underside as in the male. Antennæ black, ringed with white; head and body black above, white beneath.

Expanse of wings, ♂ ♀  $1\frac{1}{6}$  inches.

HABITAT.—Assam, Naga Hills.

The type in the Indian Museum, came from Shillong; we have received many

examples from the Khasia Hills, which have been submitted to Dr. Chapman for identification ; it is in Major Tytler's collection from the Naga Hills, and in Colonel Fawcett's collection from Toungoo, Burma.

#### Genus CHILADES.

*Chilades*, Moore, Lep. Ceylon, i. p. 76 (1881). de Nicéville, Butt. of India, iii. p. 88 (1890).  
Bingham, Fauna of Brit. India, Butt. ii. p. 364 (1907).

Eyes naked ; neuration much as in *Plebeius* and *Lycæna* ; also as to the structure of the antennæ, palpi and legs ; in the hindwing, however, veins 3 and 4 are emitted from the lower end of the cell, whereas in *Plebeius* and *Lycæna* vein 3 is emitted from a little before and 4 from the end ; the genitalia are quite different to that of the *Plebeinæ* or *Lycæninæ* and closely resemble the genitalia of the *Everids*, and Dr. Chapman and Mr. Bethune-Baker are both of opinion that this genus must stand in the sub-family *Everinæ*. The character of the wing-markings are very distinctive.

#### CHILADES LAIUS.

Plate 638, figs 3, ♂, 3a, ♀, 3b, ♀ (Wet-season Brood), 3c, ♂, 3d, ♀, 3e, ♂, 3f, ♀ (Dry-season Brood).

*Papilio lajus*, Cramer, Pap. Exot. iv. p. 62, pl. 319, figs. D, E, ♀ (1780).

*Polyommatus laius*, Horsfield and Moore, Cat. Lep. Mus. E.I.C. p. 21 (1857). Moore, Proc. Zool. Soc. 1878, p. 702.

*Lycæna laius*, Butler, Cat. Fabr. Lep. B. M. p. 171 (1869).

*Chilades laius*, Swinhoe, Proc. Zool. Soc. 1885, p. 133 ; id. Proc. Zool. Soc. 1886, p. 427. Doherty, Journ. As. Soc. Bengal, 1886, p. 133. Hampson, Journ. As. Soc. Bengal, 1888, p. 356. de Nicéville, Butt. of India, iii. p. 89, pl. 26, fig. 168, ♂, Wet-season Form, 169, ♂, Dry-season Form (1890). Watson, Journ. Bo. Nat. Hist. Soc. 1891, p. 44. Betham, id. p. 176. Swinhoe, Trans. Ent. Soc. 1893, p. 292. Nurse, Journ. Bo. Nat. Hist. Soc. 1899, p. 512 ; de Rhé-Philippe id. 1902, p. 487. Bingham, Fauna of Brit. India, Butt. ii. p. 365, pl. 19, fig. 135 (1907).

*Hesperia cajus*, Fabricius, Ent. Syst. iii. p. 296 (1793).

*Polyommatus cajus*, Godart, Enc. Méth. ix. p. 701 (1823).

*Polyommatus varunana*, Moore, Proc. Zool. Soc. 1865, p. 772, pl. 12, fig. 6 ; id. Proc. Zool. Soc. 1878, p. 702.

*Chilades varunana*, Moore, Lep. Ceylon, i. p. 77, pl. 35, fig. 3, ♂ (1881) ; id. Proc. Zool. Soc. 1882, p. 245. Swinhoe, id. 1885, p. 133, and 1886, p. 427. Wood-Mason and de Nicéville, Journ. As. Soc. Bengal, 1886, p. 365. Hampson, id. 1888, p. 356.

*Polyommatus kandura*, Moore, Proc. Zool. Soc. 1865, p. 772, pl. 12, fig. 7, ♀.

*Zizera kandura*, Swinhoe, Trans. Ent. Soc. 1885, p. 341.

*Lycæna brahma*, Felder, Reise, Nov. Lep. ii. p. 279, pl. 35, figs. 15, 16, ♀ (1865).

*Plebeius leucofasciatus*, Rober, Iris, 1886, p. 59, pl. 4, fig. 32.

Wet-season Brood (Figs. 3, ♂, 3a, ♀, 3b, ♀).

IMAGO.—Male. Upperside purplish-blue. *Forewing* with some pale blue iridescence at the base and the basal half of the costa; a fine black line on the costa and outer margin. *Hindwing*, costa rather broadly blackish, a series of sub-terminal triangular spots, decreasing in size upwards (obsolescent in some examples), and a black marginal line. Cilia brown at the base, white outwardly. Underside brownish-grey, markings mostly blackish, edged with white. *Forewing* with a lunular mark at the end of the cell, a discal series of short lunular marks curving slightly inwards below the costa, the second and fourth from the lower end oblique; a double row of sub-terminal, short, linear marks and a marginal line. *Hindwing* with three sub-basal black spots, a lunular mark at the end of the cell, a black spot on the costa beyond the middle, a spot below it, followed by an irregular series of spots, the four centre ones in an outward curve, the middle mark generally linear and always oblique, a sub-marginal series of triangular black spots close to the margin, edged inwardly by a line of brown lunules, on the inside of which there are many short whitish streaks and a terminal black line. Cilia white, with blackish marks at the vein ends. Antennæ black, ringed with white; head and body blackish above with some blue scalings, white beneath.

Female. Upperside, blackish-brown, with blue iridescence on the inner portions, the costa and outer margin broadly dark, with indications of a series of pale sub-terminal spots, more pronounced towards the hinder angle. *Hindwing* with the costal portion broadly dark, the outer margin with a band composed of rather prominent sub-terminal, triangular, black spots inwardly edged with white, followed by a series of obscure dark spots with obscure whitish edgings; terminal line black edged with a very fine whitish line. Underside as in the male, with all the markings very large and prominent and with white streaks on both wings between the discal and sub-marginal series of spots.

Expanse of wings, ♂ ♀  $1\frac{2}{5}$  inches.

Dry-season Brood (Figs. 3c, ♂, 3d, ♀, 3e, ♂, 3f, ♀).

Male and female like the Wet-season form, but the colour of the upperside paler in both sexes, and on the underside both sexes have on the lower portion of the hind-wing a brown nebulous patch, which varies in size in different examples.

Expanse of wings, ♂ ♀ 1 inch.

LARVA.—Pale green, of the shade of the young leaves of the lime and pomelo bushes on which it feeds,  $\frac{7}{8}$  of an inch in length, onisciform, head black, smooth and shining, with a somewhat dark green dorsal line down the body, the whole surface very slightly shagreened and covered with extremely fine and short downy hairs. The constrictions

between the segments slight. There are traces of two pale sub-dorsal lines and there is a pale lateral line below the spiracles. The usual extensile organs on the twelfth segment short. This larva has no distinctive markings by which it can be easily recognised, it is always a very plainly coloured and marked insect; the ant which attends it betrays its presence; the ant has been identified by Dr. A. Forel as *Campanotus rubripes*, Drury, sub-species, *compressus*, Fabricius.

PUPA.—Green of the usual lycenid shape, with a dorsal and lateral series of somewhat obscure conjoined brownish spots on the upperside. Attached to the underside of the leaves of the food-plant in the usual manner (de Nicéville).

HABITAT.—India, Burma, Ceylon, South China.

DISTRIBUTION.—Recorded by Hampson from the Nilgiris, by Betham from Bombay, by Watson from Chin Lushai, by de Rhé-Philipe from Lucknow, by Nurse from Kutch, by Moore from Bengal and Ceylon, by Wood-Mason and de Nicéville from Cachar; we took it at Quetta, Poona and Mhow, and have received it from the Khasia Hills. It is also in the B. M. from Calcutta, Maulmein, Durbunga, Hongkong, Tonkin and Formosa.

#### CHILADES TROCHILUS.

Plate 639, figs. 1, ♂, 1a, ♀, 1b, ♂.

*Lycæna trochilus*, Freyer, Neue Beitr. Schmett. v. p. 98, pl. 440, fig 1 (1844). Herrich-Schäffer, Schmett. Eur. i. p. 128, pl. 48, figs. 224, 225, ♂, pl. 49, fig. 226, ♀ (1844). Wallengren, Kongl. Sv. vet-akad. Handl. Lep. Caffr. 2nd series, ii. p. 41 (1857). Trimen, Rhop. Afr. Aust. ii. p. 256 (1866). Lang, Butt. of Eur. p. 103, pl. 22, fig. 7 (1884). Trimen, South Afr. Butt. ii. p. 52 (1887).

*Polyommatus trochilus*, Kirby, Eur. Butt. p. 99 (1862).

*Plebeius trochilus*, Butler, Proc. Zool. Soc. 1996, p. 368.

*Zizera trochilus*, Butler, Proc. Zool. Soc. 1884, p. 484. Swinhoe, Trans. Ent. Soc. 1885, p. 341; id. Journ. Bo. Nat. Hist. Soc. 1887, p. 273.

*Chilades trochilus*, de Nicéville, Butt. of India, iii. p. 91 (1890). de Nicéville, Journ. Bo. Nat. Hist. Soc. 1890, p. 385. Watson, id. 1891, p. 44. Betham, id. p. 177. Watson, id. 1897, p. 658. Mackinnon and de Nicéville, id. 1898, p. 379. de Rhé-Philipe, id. 1902, p. 487. Leslie and Evans, id. 1903, p. 673. Bingham, Fauna of Brit. India, Butt. ii. p. 367 (1907).

*Lycæna parva*, Murray, Trans. Ent. Soc. 1874, p. 526, pl. 10, fig. 1.

*Lycæna gnoma*, Snellen, Tijds. voor Ent. 1876, p. 159, pl. 7, fig. 1.

IMAGO.—Male. Upperside lavender-blue, varying much in tint, from pale lavender to brownish-blue; both wings with outer marginal, very fine brown line. *Hindwing* with three prominent sub-marginal black spots near the anal angle, with a series of very ill-defined pale spots in continuation up the margin, the three black spots with broad orange-ochreous lunules attached to their inner sides; and close to these runs a series of minute whitish spots. Marginal line finely brown, with a fine white line on its inner side. Cilia white with a basal brown band. Underside grey, all the markings

edged with white. *Forewing* with a short brown bar at the end of the cell, a discal series of round black spots, the upper one curved inwards below the costa, the lower two in a line a little inwards; a sub-terminal double row of pale brown lunular marks more or less joined together with white lunular marks between them, and on the inner side a very fine terminal brown line with inner white edging. *Hindwing* with four sub-basal black spots in a line, a black spot in the middle of the costa, three transverse, irregular bands of the ground colour, divided by the veins, formed by their white edgings; the marginal spots and orange markings as on the upper side, the three black spots with metallic green scales.

Female. Upperside dark brown, both wings with a darker marginal line. *Hindwing* with four black spots edged inwardly by an orange band, composed of broad lunular marks joined together. Underside like the male, except for the four black spots with metallic scales and the orange band which are the same as on the upperside. Antennæ black, speckled with white above, nearly all white beneath; head and body blackish above, white beneath.

Expanse of wings, ♂ ♀  $\frac{8}{10}$  inch.

**LARVA.**—When full-grown a little over a quarter of an inch in length, onisciform as usual; the head very small, black and shining, entirely hidden when at rest, being covered by the second segment; the colour of the body grass-green, with a dark green dorsal line from the third to the twelfth segment; two sub-dorsal series of short parallel streaks, each pair being divided from the next by the segmental constriction, these streaks paler than the ground colour; an almost pure white lateral line below the spiracles, which is the most conspicuous of all the markings; the segmental constrictions rather deep; the whole surface of the body shagreened, being covered with very small whitish tubercles from which spring very faint short colourless hairs. The usual extensile organs on the twelfth segment; food plant *Heliotropium strigosum*, Willd. Professor A. Forel identifies the ant which attends it as *Pheidole quadrispinosa*, Jerdon.

**PUPA.**—About  $\frac{3}{8}$  of an inch in length, pale green, of the usual lycænid shape, densely covered everywhere except on the wing-cases with somewhat long white hairs (de Nicéville).

**HABITAT.**—Northern and North-Western India, Asia Minor, Persia, Arabia and many parts of Africa.

**DISTRIBUTION.**—de Nicéville records it from the Chin Hills, Betham from the Central Provinces, Watson from Chin Lushai, Mackinnon and de Nicéville from Mussuri, de Rhé-Philipe from Lucknow, Leslie and Evans from Chitral; we have taken it at Quetta, the Hubb River, Beloochistan and at Karachi, and have received it from Attock, Ranighat and Kairabad. It is in the B. M. also from Aden, Muscat, Socotra and many parts of Africa.

## CHILADES PUTLI.

Plate 639, figs. 2, ♂, 2a, ♀, 2b, ♂.

*Lycæna putli*, Kollar, Hugel's Kaschmir, iv. (2), p. 422 (1848).

*Chilades putli*, Moore, Lep. Ceylon, i. p. 77, pl. 35, figs. 4, 4a (1881); id. Proc. Zool. Soc. 1882, p. 245.

Swinhoe, Proc. Zool. Soc. 1884, p. 507, and 1886, p. 427. Watson, Journ. Bo. Nat. Hist. Soc. 1890, p. 34. Nurse, id. 1899, p. 512.

*Zizera putli*, Hampson, Journ. As. Soc. Bengal, 1888, p. 356.

*Chilades (Lycaena) putli*, Manders, Trans. Ent. Soc. 1890, p. 528.

*Chilades trochilus*, Davidson, Bell and Aitken (nec Freyer), Journ. Bo. Nat. Hist. Soc. 1896, p. 373.

Aitken and Comber, id. p. 47.

IMAGO.—Male. Upperside blackish-brown, with a slight violaceous tinge, both wings with a marginal darker line. Hindwing with four (sometimes indications of a fifth) black sub-terminal spots in a row on the lower half of the wing, sometimes edged with very indistinct pale ochreous. Cilia white, grey at the base. Underside with the ground colour darker than in *trochilus*, the markings similarly disposed, but none of them are black, except the four sub-basal spots and the costal spot on the hindwing, all the other spots are of the ground colour of the wings, formed by their white edgings, and there are five and sometimes six sub-terminal black spots with blue metallic scales. Antennæ black, ringed with white, head and body black above, white beneath.

Female. Above and below like the male.

Expanse of wings, ♂ ♀  $\frac{7}{8}$  inch.

HABITAT.—Throughout India and Ceylon.

DISTRIBUTION.—Watson records it from Mysore, Nurse from Kutch, Manders from the Shan States; we have taken it at Deesa, Karachi, Mhow, Poona and Bombay, and have received it from Campbellpur, Nilgiris and Ceylon; it is in the B. M. also from Kutch, Ganjam, Berhampore, Tilin Yaw, Port Darwin and Queensland.

## Genus TALICADA.

*Talicada*, Moore, Lep. Ceylon, i. p. 96 (1881). de Nicéville, Butt. of India, iii. p. 134 (1890).

Bingham, Fauna of Brit. India, Butt. ii. p. 375 (1907).

Eyes naked. An aberrant form of Everid; the very unusual (in Lycænidæ) union of two lateral valves of the dorsal armature of ancillary appendages (*uncus*) characteristic of Everids is here carried so far that there is only a single central spike with lateral parameres (the usual hooks), the whole much resembling the dorsal armature in *Erebia* (Chapman). Forewing, cell long and narrow, veins 3 and 7 from close to lower and upper ends of the cell; 3 and 4, and 6 and 7 respectively very closely approximate at base; 8 absent, 9 from middle of 7, 10 and 11 from apical half of

sub-costal, vein 11 joins 12, and they do not again separate as they do in other Everids. Costa arched, apex rounded, outer margin convex, hinder angle obtuse, hinder margin sinuate. *Hindwing* oval, costa, outer margin and hinder angle in a continuous curve, cell short, narrow, middle and lower discocellulars obsolescent, veins 3 and 4 from lower end of cell, 8 arched at base, extending very close to costal margin to apex. Antennae more than half the length of the costa of forewing; club long, gradual; palpi sub-porrect, third joint very long, naked.

#### TALICADA NYSEUS.

Plate 639, figs. 3, ♂, 3a, ♀, 3b, ♂, 3c (larva and pupa).

*Polyommatus nyseus*, Guérin, Delessert's Souv. Voy. dans l'Inde, p. 78, pl. 22, figs. 1, 1a (1843).

*Scolitantides nyseus*, Butler, Proc. Zool. Soc. 1881, p. 607.

*Talicada nyseus*, Moore, Lep. Ceylon, i. p. 97, pl. 39, figs. 1, 1a (imago), 1b (larva and pupa), (1881). Swinhoe, Proc. Zool. Soc. 1885, p. 133. Hampson, Journ. As. Soc. Bengal, 1888, p. 358. de Nicéville, Butt. of India, iii. p. 135 (1890). Manders, Trans. Ent. Soc. 1890, p. 528. Watson, Journ. Bo. Nat. Hist. Soc. 1890, p. 35. Watson, id. 1894, p. 45. Aitken and Comber, id. 1903, p. 47. de Rhé-Philipe, id. 1906, p. 230. Davidson, Bell and Aitken, id. 1896, p. 375, pl. 4, figs. 1, 1a (larva and pupa). Bingham, Fauna of Brit. India, Butt. ii. p. 376, pl. 19, fig. 140, ♀ (1907).

*Lycæna nyseus*, Staudinger, Ex. Schmett. p. 271, pl. 94, ♀ (1888).

IMAGO.—Male. Upperside black. Cilia of both wings spotted with white. *Forewing* with costal line very finely white. *Hindwing* with a conspicuous orange-red patch occupying more than the lower third of the wing, extending from the abdominal margin to vein 6, its inner side then angled and continued along the vein to the outer margin, its inner edge is uneven, and the black colour runs down the abdominal margin narrowly to the anal angle, and the patch is bordered outwardly by a black line on the outer margin. Underside greyish-white. *Forewing* with a black bar at the end of the cell, the outer part of the wing deep black, covering much more than a third of the wing, its inner edge curved from the costa to its middle, then nearly straight to the hinder margin; inside the black portion are two rows of prominent white spots, and an anteciliary broken white line of short linear marks. *Hindwing* with a black basal spot, one below it on the abdominal margin, a larger spot below the costal third, a small one below this, a large linear sub-costal mark beyond the middle, a bar at end of cell, a small spot below it in the lower disc, and one opposite on the abdominal margin beyond its middle; apex of the wing with a black triangular patch with two white spots in it, a broad orange-red band on the outer margin, which is narrower than the apical patch, and has a series of prominent white spots across its middle, a black marginal line, with a fine broken white line on its inner side. Cilia of both wings

black with white spots; tails black with white tips. Antennæ black, ringed with white; head and body black above, white beneath.

Female. Like the male above, on the underside, the black cell bar of forewing is replaced by a large black round spot, and the white spots in the outer portion are much larger. *Hindwing* with the spots larger, the orange outer band paler, and near its inner side is an irregular band of black spots in addition to those in the male.

Expanse of wings, ♂  $1\frac{1}{10}$ , ♀  $1\frac{5}{10}$  inches.

**LARVA.**—Feeds on *Bryophyllum calycinum*, is onisciform, but much rounded, and with the segments at the divisions very clearly defined; head small, almost concealed, last segment flattened. It is in colour fleshy-white, with a row of nine black dots along the back on each side, and a ring of four similar dots on the segment nearest the head; it is profusely covered with small white hairs; it feeds in the interior of the fleshy leaves, only emerging in order to turn pupa.

**PUPA.**—Much resembles the larva, being short and blunt, and covered with short, white hair. It is of the same fleshy colour as the larva, and has two lines of small black dots along the surface of the abdomen continued along the thorax. It also has a third row of four similar dots on the middle of the abdomen between them; the two dots on the thorax nearest the head are also connected with two other dots (Davidson, Bell and Aitken).

**HABITAT.**—South India and Ceylon.

**DISTRIBUTION.**—Hampson records it from the Nilgiris, Watson from Mysore and Chin Lushai, Aitken from Mahableshwur, de Rhé-Philipe from Khandala, Manders from the Shan States; we have taken it also at many places round and about Bombay, and have received it also from Ceylon. There is a curious albino example from Ceylon in the B. M., on the upperside the black portion is very deep black, and the patch in the hindwing, instead of being orange-red, is pure white.

#### TALICADA KHASIANA.

Plate 639, figs. 4, ♂, 4a, ♀, 4b, ♂.

*Talicada khasiana*, Swinhoe, Trans. Ent. Soc. 1893, p. 296.

*Talicada nyseus*, var. *khasia*, H. H. Druce, Proc. Zool. Soc. 1902, p. 113.

*Talicada nyseus*, de Nicéville, Butt. of India, iii. pl. 26, fig. 179, ♀ (1890).

**IMAGO.**—Male. Upperside black. *Forewing* as in *nyseus*. *Hindwing* with the orange-red band much narrower and of a different shape, both ends of it being more or less rounded. Underside greyish-white, markings deep black. *Forewing* with a round spot at the end of the cell, immediately followed by a broad, dislocated, transverse band, then a broad white space, then a post-discal, narrower, somewhat even band, joined by thin black bars on the veins to a sub-terminal, still narrower and quite even band,

joined by finer bars to the black terminal line. *Hindwing* with the black apical patch of the same width as the orange-red band, all the spots larger than in *nyseus* and more numerous, most of them joined together, forming a transverse medial band broken and disjointed in its middle and a small curved band outside it in the middle of the disc. Cilia, antennæ, head and body as in *nyseus*.

Female. Like the male, band and spots below larger.

Expanse of wings, ♂  $1\frac{2}{10}$ , ♀  $1\frac{3}{10}$  to  $1\frac{4}{10}$  inches.

HABITAT.—Khasia Hills, Assam.

A good local form, the underside quite distinctive, and does not vary in the many hundreds of specimens we have received from the Khasia Hills. de Nicéville, though he described *nyseus* correctly, figured a Khasia Hill example of *khasiana* from Shillong in error.

#### ERRATA.

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Page 11, *Catophaga swinhœi* should be *Catophaga ares*; *swinhœi* becomes a synonym, *ares* not being preoccupied in the Genus *Catophaga*.

,, 49, *blairii* should be *blairiana*.

,, 102, *Ixias kausala*, 1b, 1c (Dry-season Brood), should be 1b, 1d, and 1c (Extreme Dry-season Brood).

,, 102, *kansala* should be *kausala*.

,, 104, *Ixias dharmsalæ*, figs. 1, 1a, 3, ♀, should be 1, 1a, ♂, ♀.

,, 149, line Madders, should be Manders.

,, 160, *helichta* should be *helichtha*.

,, 165, *Euryalus eogene*, erase 2c, ♀.

,, 206, Section II. *Lycænopsisæ* should be *Lycænopsis*.

Plate 591, *Hebomoia glaucippe*, figs. 1d, 1e, represent the larva and pupa of *Hebomoia javanensis*.

,, 637, fig. 12; the artist has figured two males, instead of male and female.

## A D D E N D A.

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### Genus UNA.

Plate 660, figs. 1, ♂, 1a, ♂.

*Una*, de Nicéville, Butt. of India, iii. p. 51 (footnote), 1890.

Eyes hairy. *Forewing* with veins 11 and 12 anastomosing as in *Pithecopis*, 12 terminating beyond the upper end of the cell, vein 10 emitted from one-fourth before upper end of cell, 7 from just before the end; 8 absent; 9 out of 7 beyond its middle, lower discocellular as long as the middle, concave and upright, vein 3 emitted some distance before lower end of cell; costa nearly straight for two-thirds, somewhat arched before apex, outer margin slightly convex, hinder margin straight. *Hindwing*, vein 8 strongly arched at base, then straight to apex; 7 emitted some little distance before upper end of cell, upper discocellular outwardly oblique and slightly concave, lower discocellular upright also slightly concave, vein 3 from a little before lower end of cell; internal nervure recurved, short; costa slightly arched, outer margin convex, apex rounded, anal angle somewhat acute, abdominal margin nearly straight, no tails. Palpi with long hairs, third joint long, naked, acicular. Antennæ half as long as costa of forewing, with a large spatulate club.

Type, *usta*, Distant.

We have had examples of this species dissected by Dr. Chapman, who informs us that the Genitalia seems related to *Megisba* and *Neopithecopis*; in venation it is nearest to *Pithecopis*, and therefore we place it at the end of the Indian *Lycænopsinæ*; unfortunately we did not receive the examples from Major Tytler until after the Parts containing that sub-family were in print.

### UNA USTA.

*Zizera? usta*, Distant, Ann. Mag. Nat. Hist. 1886, p. 531; id. Rhop. Malayana, p. 454, pl. 44, fig. 5 (1886).

*Una usta*, de Nicéville, Butt. of India, iii. p. 51 (footnote) (1890).

IMAGO.—Male. Upperside violaceous-brown. *Forewing*, costal and outer marginal line black, and some black suffusion narrowly on the hinder margin. *Hindwing* with a black outer marginal line. Cilia blackish. Underside dark grey

with a violaceous tint; markings black. *Forewing* with a pair of spots inside the cell, one above the other, and a paler spot at the end, a discal, uniform series of five spots, the lowest three nearly straight, the upper two well curved inwards. *Hindwing* with two large sub-costal spots, two small basal spots, a spot inside the cell below the inner large sub-costal spot, and another in a line below it, a pale small spot below the outer large sub-costal spot, a pale linear mark at the end of the cell, a discal, outwardly curved series of four spots, another in continuation, close to the abdominal margin and between them, but well outside and near the anal angle, another small spot; both wings with a sub-terminal series of pale brown, rather thick, lunular marks. Antennæ black, ringed with white; palpi, head and body black above, white beneath.

Female unknown.

Expanse of wings, 1 inch.

HABITAT.—Naga Hills, Malay Peninsula.

DISTRIBUTION.—The type-specimen came from Malacca, we have it in our collection from Perak and Deli, Sumatra, and Major Tytler has kindly brought us two examples taken by him at Gaspani, Naga Hills, 1,500 ft. elevation, November, 1909. It is new to the Indian fauna; the spots on the underside, in the examples before us, varying only in the shade of colour.

## INDEX OF GENERA AND SPECIES.

## VOL. VII.

*Abæis*, 36.  
*absens* (*Allotinus*), 200.  
*acaste* (*Pontia*), 156.  
*acraga* (*Gerydus*), 189.  
*acuminata* (*Colias*), 28.  
*acuminata* (*Gonepteryx*), 28.  
*ada* (*Terias*), 78.  
*adamsoni* (*Catophaga*), 4.  
*enippe* (*Papilio*), 99.  
*esiopæ* (*Terias*), 79.  
*esiopœoides* (*Terias*), 49, 60.  
*agave* (*Catophaga*), 14.  
*agave* (*Pieris*), 14.  
*agnivæna* (*Ixias*), 115.  
*aias* (*Euryimus*), 173.  
*aias* (*Colias*), 173.  
*airavati* (*Castalius*), 243.  
*akasa* (*Lycænopsis*), 223.  
*akasa* (*Cyaniris*), 223.  
*alana* (*Ixias*), 107.  
*albatus* (*Allotinus*), 199.  
*alberta* (*Callosune*), 140.  
*albidisca* (*Lycænopsis*), 217.  
*albidisca* (*Cyaniris*), 217.  
*albidisca* (*Pathalia*), 228.  
*albina* (*Appias*), 9, 14.  
*albocerulea* (*Lycænopsis*), 225.  
*albocerulea* (*Cyaniris*), 225.  
*alboceruleus* (*Zizera*), 262.  
*alboceruleus* (*Plebeius*), 262.  
*alecene* (*Papilio*), 84.  
*alcyone* (*Catopsilia*), 94.  
*alitha* (*Terias*), 80.  
*alkama* (*Allotinus*), 196.  
*Allotinus*, 194.  
*Alope* (*Pieris*), 14.  
*alope* (*Lycena*), 262.  
*alpheraki* (*Euryimus*), 163.  
*alpheraki* (*Colias*), 163.  
*alteratus* (*Tarucus*), 250.  
*alvinda* (*Colias*), 28.  
*alvinda* (*Gonepteryx*), 28.  
*amasene* (*Pieris*), 14.  
*amata* (*Colotis*), 142.  
*aminta* (*Colias*), 28.  
*aminta* (*Gonepteryx*), 28.  
*ananda* (*Castalius*), 238.

*ananga* (*Lycænopsis*), 226.  
*ancon* (*Gerydus*), 188.  
*andamana* (*Gandaca*), 35.  
*andamana* (*Terias*), 49, 75.  
*andamana* (*Ixias*), 109.  
*andersoni* (*Terias*), 49, 71.  
*anemone* (*Terias*), 79.  
*anezibia* (*Ixias*), 99.  
*angustior* (*Castalius*), 248.  
*annamica* (*Gandaca*), 35.  
*annamica* (*Nirmula*), 46.  
*annamica* (*Terias*), 46.  
*Anteos*, 23.  
*Anthocharinæ*, 22.  
*Anthocharis*, 120.  
*aphoca* (*Allotinus*), 199.  
*apicalis* (*Terias*), 59.  
*approximatus* (*Castalius*), 240.  
*apus* (*Allotinus*), 199.  
*aremicleus* (*Teracolus*), 155.  
*ares* (*Appias*), 11.  
*ares* (*Catophaga*), 278.  
*argia* (*Zizera*), 262.  
*argia* (*Lycæna*), 262.  
*ariades* (*Everes*), 263.  
*ariolus* (*Lycæna*), 212.  
*argola* (*Castalius*), 248.  
*argola* (*Lycæna*), 248.  
*arida* (*Euryimus*), 173.  
*arida* (*Colias*), 173.  
*ariades* (*Everes*), 263.  
*ariolus* (*Lycæna*), 212.  
*artropœtes*, 227.  
*aphrodulus* (*Terias*), 49, 62.  
*assamensis* (*Gerydus*), 193.  
*assamica* (*Gandaca*), 33.  
*asterope* (*Pieris*), 19.  
*attenuata* (*Terias*), 79.  
*audax* (*Allotinus*), 199.  
*auriflua* (*Gandaca*), 36.  
*auriflua* (*Terias*), 36.  
*aurora* (*Papilio*), 129.  
*austini* (*Castalius*), 248.  
*australis* (*Hebomoia*), 125.  
*avatar* (*Pareronia*), 174.  
*avalar* (*Eronia*), 174.  
*balice* (*Ixias*), 118.

*bambusarum* (*Euchloë*), 121.  
*bambusarum* (*Anthocharis*), 121.  
*bebryce* (*Ixias*), 115.  
*berylla* (*Euryimus*), 169.  
*berylla* (*Colias*), 169.  
*bethesba* (*Nirmula*), 47.  
*bethesba* (*Terias*), 47.  
*bidens* (*Terias*), 78.  
*bieti* (*Euchloë*), 122.  
*bieti* (*Anthocharis*), 122.  
*bigsii* (*Gerydus*), 192.  
*bimbura* (*Teracolus*), 132.  
*binghami* (*Lycænopsis*), 205.  
*binghami* (*Notarthrinus*), 205.  
*Binghamia*, 262.  
*birdi* (*Ixias*), 119.  
*blairii* (*Terias*), 49.  
*blairiana* (*Terias*), 75, 278.  
*blanda* (*Terias*), 78.  
*boisduvali* (*Gerydus*), 189.  
*boisduvali* (*Miletus*), 189.  
*borneensis* (*Hebomoia*), 127.  
*borneensis* (*Iphias*), 127.  
*Bothria*, 269.  
*Bothrinia*, 269.  
*brahma* (*Lycæna*), 271.  
*brindhaba* (*Dercas*), 30.  
*burmana* (*Gandaca*), 34.  
*cadellii* (*Terias*), 49, 77.  
*cagaya* (*Lycænopsis*), 226.  
*cagaya* (*Lycæna*), 226.  
*cajus* (*Hesperia*), 271.  
*calais* (*Teracolus*), 142, 145.  
*calinara* (*Teracolus*), 250.  
*Callidryas*, 80.  
*Callidryinæ*, 22.  
*callirhoe* (*Papilio*), 123.  
*Callosune*, 127, 129.  
*camena* (*Lycænopsis*), 227.  
*camena* (*Cyaniris*), 227.  
*candaules* (*Lycænopsis*), 227.  
*candaules* (*Cyaniris*), 227.  
*cara* (*Lycænopsis*), 227.  
*cara* (*Cyaniris*), 227.  
*carna* (*Lycænopsis*), 227.  
*carna* (*Cyaniris*), 227.  
*carnifer* (*Teracolus*), 144.

*carnipeurus* (Gonepteryx), 24.  
*cassimirus* (Teracolus), 132.  
*Castalia*, 238.  
*catilla* (Catopsisilia), 84.  
*Catophaga*, 2, 278.  
*Catopsisilia*, 80.  
*catreus* (Lycenopsis), 227.  
*catreus* (Cyaniris), 227.  
*caudatus* (Allotinus), 199.  
*Clastrina*, 203.  
*celebensis* (Castalius), 248.  
*ceyanica* (Pareronia), 180.  
*ceyanica* (Eronia), 180.  
*ceyanica* (Eronia), 181.  
*ceylonica* (Hebomoia), 125.  
*ceyx* (Lycenopsis), 226.  
*ceyx* (Cyaniris), 226.  
*chandala* (Zizera), 254.  
*chennellii* (Bothrinia), 270.  
*chennellii* (Cyaniris), 270.  
*Chilades*, 271.  
*chinensis* (Eurymus), 173.  
*chinensis* (Colias), 173.  
*chinensis* (Gerydus), 189.  
*chitalensis* (Colias), 27.  
*chlorographa* (Leptosia), 20.  
*chota* (Castalius), 240.  
*chrysea* (Saletara), 15.  
*chryseis* (Catopsisilia), 97.  
*chrysodona* (Eurymus), 160.  
*chrysodona* (Colias), 160.  
*chrysomela* (Teracolus), 155.  
*cingula* (Terias), 42.  
*cingalensis* (Ixias), 108.  
*citrina* (Terias), 49, 65.  
*citrina* (Ixias), 114.  
*clathratus* (Tarucus), 253.  
*clyton* (Papilio), 239.  
*coalita* (Lycenopsis), 226.  
*coalita* (Cyaniris), 226.  
*cocandica* (Eurymus), 173.  
*cocandica* (Colias), 173.  
*celestina* (Lycenopsis), 213.  
*celestina* (Cyaniris), 213.  
*celestis* (Teracolus), 156.  
*cencos* (Euchloe), 129.  
*colaba* (Ixias), 104.  
*Colias*, 23.  
*Colias*, 80, 156.  
*COLLINE*, 22.  
*Colotis*, 141.  
*compacta* (Nephronia), 177.  
*connexiva* (Terias), 80.  
*contubernalis* (Terias), 51.  
*coridon* (Papilio), 240.  
*cornelia* (Papilio), 96.  
*cornuta* (Cupido), 226.  
*corythus* (Lycenopsis), 227.  
*corythus* (Cyaniris), 227.  
*co-sea* (Lycenopsis), 227.

*cossaea* (Cyaniris), 227.  
*crissa* (Cyaniris), 210.  
*crocale* (Catopsisilia), 84.  
*croton* (Gerydus), 191.  
*cumballa* (Ixias), 115.  
*curiosa* (Terias), 51.  
*cyanescens* (Lycenopsis) 211.  
*cyanescens* (Cyaniris), 211.  
*Cyaniris*, 203.  
*cyprea* (Colotis), 142.  
*cyprea* (Teracolus), 142.  
*danae* (Callosune), 136.  
*danae* (Teracolus), 136.  
*daphalis* (Euchloe), 120.  
*daphalis* (Anthocharis), 120.  
*darada* (Catophaga), 12.  
*darada* (Pieris), 12.  
*davidi* (Everes), 269.  
*davidi* (Lycaena), 269.  
*davidsoni* (Terias), 49, 63.  
*decidia* (Castalius), 247.  
*decidia* (Lycaena), 247.  
*decipiens* (Dercas), 30.  
*deliciosa* (Lycenopsis), 227.  
*deliciosa* (Cupido), 227.  
*depalpura* (Ixias), 115.  
*Dercas*, 28.  
*dharma* (Pithecopus), 230.  
*dharma* (Ixias), 104.  
*diformis* (Dercas), 32.  
*dilama* (Spalgis), 236.  
*dilama* (Lucia), 236.  
*dictaea* (Lycenopsis), 222.  
*dictaea* (Cyaniris), 222.  
*dictessima* (Lycenopsis), 227.  
*dictessima* (Cyaniris), 227.  
*diluta* (Lycaena), 254.  
*dipora* (Everes), 267.  
*dipora* (Lycaena), 267.  
*diporidae* (Everes), 264.  
*dirus* (Teracolus), 138.  
*distanti* (Catophaga), 14.  
*distanti* (Saletara), 16.  
*distanti* (Gandaca), 35.  
*distanti* (Logania), 203.  
*diva* (Eurymus), 173.  
*diva* (Colias), 173.  
*diversa* (Terias), 80,  
*dohertyi* (Gandaca), 35.  
*domitia* (Tachyris), 19.  
*domitia* (Pieris), 19.  
*doubledayi* (Dercas), 31.  
*drona* (Kibreeta), 40.  
*drona* (Terias), 40.  
*drumila* (Allotinus), 194.  
*drumila* (Miletus), 194.  
*Dryade*, 22.  
*dryina* (Zizera), 260.  
*dubia* (Eurymus), 167.  
*dubia* (Colias), 167.

*dubius* (Teracolus), 150.  
*dulcis* (Callosune), 138.  
*dulcis* (Teracolus), 138.  
*duponchellii* (Lycenopsis), 226.  
*duponchellii* (Polyommatus), 226.  
*dynamine* (Colotis), 144.  
*dynamine* (Teracolus), 144.  
*Earina*, 23.  
*eboreoides* (Teracolus), 138.  
*echeria* (Idmais), 155.  
*elma* (Castalius), 246.  
*elna* (Lycaena), 246.  
*elwesi* (Eurymus), 164.  
*elwesi* (Colias), 164.  
*elwesi* (Colias), 173.  
*enara* (Dercas), 32.  
*engania* (Saletara), 16.  
*enippe* (Papilio), 99.  
*eogene* (Eurymus), 165.  
*eogene* (Colias), 165.  
*epigone* (Callosune), 156.  
*epigone* (Anthopsyché), 156.  
*epius* (Spalgis), 234.  
*epius* (Lucia), 234.  
*erate* (Eurymus), 157.  
*erate* (Colias), 157.  
*Ericolias*, 156.  
*eris* (Teracolus), 156.  
*eris* (Pontia), 156.  
*Eronia*, 174.  
**ERONIIDÆ**, 174.  
*erschoffii* (Eurymus), 173.  
*erschoffii* (Colias), 173.  
*ethion* (Castalius), 241.  
*ethion* (Lycaena), 241.  
*etrida* (Callosune), 132.  
*etrida* (Anthocharis), 132.  
*eucharis* (Callosune), 129.  
*eucharis* (Teracolus), 129.  
*Euchloe*, 120.  
*euonyme* (Teracolus), 138, 140.  
*Eurema*, 47.  
*Eurimini*, 22.  
*Eurymus*, 156.  
*Everes*, 262.  
**EVERINÆ**, 262.  
*evippe* (Ixias), 118.  
*excavata* (Terias), 49, 57.  
*extricatus* (Tarucus), 250.  
*fabius* (Allotinus), 199.  
*fabius* (Paragerydus), 199.  
*fallax* (Allotinus), 199.  
*familiaris* (Ixias), 99.  
*fangola* (Spalgis), 236.  
*fangola* (Lucia), 236.  
*farrinus* (Teracolus), 132.  
*fasciatus* (Tarucus), 253.  
*fatma* (Idmais), 156.  
*fausta* (Madais), 153.  
*fausta* (Teracolus), 153.

*faustina* (Idmais), 153.  
*felderi* (Eurymus), 173.  
*felderi* (Colias), 173.  
*felderi* (Allotinus), 200.  
*felderi* (Paragerydus), 200.  
*Fidelia*, 22.  
*fieldi* (Eurymus), 171.  
*fieldi* (Colias), 171.  
*figulina* (Tachyris), 18.  
*figulina* (Pieris), 18.  
*filicaudis* (Everes), 269.  
*filicaudis* (Lampides), 269.  
*fimbriata* (Terias), 49, 58.  
*fischeri* (Everes), 269.  
*fischeri* (Lycena), 269.  
*flavus* (Tachyris), 19.  
*flavus* (Appias), 19.  
*flavipennis* (Ixias), 119.  
*fluvialis* (Tarucus), 253.  
*formosa* (Terias), 34, 35, 36.  
*fraterna* (Terias), 49, 72.  
*fraterna* (Pareronia), 181.  
*frequens* (Ixias), 107.  
*Frugacia*, 22.  
*fruhstorferi* (Kibreeta), 40.  
*fulgens* (Pithecopus), 233.  
*fulvia* (Madais), 154.  
*fulvia* (Idmais), 154.  
*gaea* (Eronia), 176.  
*gaesa* (Gerydus), 193.  
*gaika* (Zizera), 256.  
*gaika* (Lycena), 256.  
*galathea* ((Catophaga)), 6.  
*galathea* (Pieris), 6.  
*galba* (Tachyris), 17.  
*galba* (Lycena), 258.  
*galene* (Catophaga), 9.  
*galene* (Pieris), 9.  
*gallus* (Gerydus), 193.  
*Gandaca*, 33.  
*gaudua* (Ixias), 107.  
*gaura* (Pithecopus), 230.  
**GERYDINE**, 186.  
*Gerydus*, 186.  
*gigantea* (Agalais), 122.  
*gigantea* (Leucophasia), 122.  
*gigantes* (Gerydus), 193.  
*gigas* (Gerydus), 193.  
*glaucippe* (Hebomoia), 123.  
*glicia* (Eurymus), 159.  
*glicia* (Colias), 159.  
*gnoma* (Catopsilia), 90.  
*gnoma* (Lycena), 273.  
*gobrias* (Dercas), 32.  
*gobrias* (Gonoptynx), 32.  
*goetulus* (Gerydus), 193.  
*Gonoptera*, 23.  
*Gonoptynx*, 23.  
*Goniapteryx*, 23.  
*Gonioptera*, 23.  
*gopara* (Gerydus), 192.  
*gorgophone* (Callidryas), 96.  
*gradiens* (Terias), 78.  
*grandis* (Terias), 49, 67.  
*grumi* (Eurymus), 173.  
*grumi* (Colias), 173.  
*gunga* (Megisba), 228.  
*hainana* (Nirmula), 47.  
*hainana* (Terias), 47.  
*hainanensis* (Tachyris), 19.  
*halimed* (Teracolus), 156.  
*halimed* (Pontia), 156.  
*hamada* (Tarakta), 237.  
*hamada* (Miletus), 237.  
*hamatus* (Castalius), 247.  
*haraldus* (Lycenopsis), 226.  
*harina* (Gandaca), 36.  
*Hebomoia*, 122.  
*hecabe* (Terias), 49, 50.  
*hecaeboides* (Terias), 51.  
*heera* (Catopsilia), 84.  
*helictha* (Colias), 160, 278.  
*helicttha* (Colias), 278.  
*helioiphila* (Terias), 68.  
*heracleon* (Gerydus), 193.  
*hersilia* (Lycenopsis), 226.  
*hersilia* (Cyaniris), 226.  
*hilaria* (Catopsilia), 84.  
*hippia* (Pareronia), 175.  
*hippia* (Nephronia), 175.  
*hobsoni* (Terias), 79.  
*horsfieldi* (Allotinus), 198.  
*horsfieldi* (Miletus), 198.  
*horsfieldi* (Neopithecopus), 230.  
*huegellii* (Lycenopsis), 212.  
*huegellii* (Cyaniris), 212.  
*hybrida* (Terias), 80.  
*hyrax* (Pithecopus), 232.  
*ida* (Zizera), 262.  
*ida* (Lycena), 262.  
*Idmais*, 141.  
*ilea* (Catopsilia), 91.  
*illissus* (Castalius), 248.  
*illissus* (Danis), 248.  
*immaculatus* (Teracolus), 138.  
*imperatrix* (Lycenopsis), 227.  
*imperatrix* (Cyaniris), 227.  
*improbus* (Gerydus), 194.  
*indice* (Lycena), 260.  
*indroides* (Pieris), 1.  
*innocens* (Gerydus), 194.  
*insignis* (Ixias), 119.  
*insignis* (Miletus), 194.  
*intermissus* (Colotis), 151.  
*intermissus* (Teracolus), 151.  
*interruptus* (Castalius), 247.  
*invida* (Terias), 80.  
*ion* (Everes), 269.  
*ion* (Lycena), 269.  
*Iphias*, 122.  
*irregularis* (Terias), 58.  
*irroratus* (Miletus), 189.  
*Ixias*, 97.  
*jaegeri* (Terias), 45.  
*japonica* (Lycena), 262.  
*javanensis* (Hebomoia), 127.  
*javanensis* (Iphias), 127.  
*jhoda* (Ixias), 104.  
*jugurtha* (Papilio), 84.  
*jugurthina* (Colias), 84.  
*jynteana* (Lycaenopsis), 221.  
*jynteana* (Cyaniris), 221.  
*kala* (Everes), 268.  
*kana* (Terias), 49, 69.  
*kandura* (Polyommatus), 271.  
*kangeana* (Pareronia), 182.  
*kangeana* (Nephronia), 182.  
*kansala* (Ixias), 102.  
*karsandra* (Zizera), 258.  
*kasmira* (Polyommatus), 213.  
*kausala* (Ixias), 278.  
*keunedii* (Teracolus), 142.  
*khasia* (Talicada), 277.  
*khiasiana* (Talicada), 277.  
*Kibreeta*, 36.  
*kyrsia* (Lycena), 258.  
*kollari* (Lycena), 213.  
*kollari* (Cyaniris), 213.  
*kuhni* (Lycenopsis), 226.  
*kuhni* (Cyaniris), 226.  
*lacteola* (Terias), 51.  
*lada* (Eurymus), 173.  
*lada* (Colias), 173.  
*ladakensis* (Colias), 162.  
*Lade*, 1.  
*ladonides* (Lycenopsis), 226.  
*ladonides* (Lycena), 226.  
*leta* (Nirmula), 44.  
*leta* (Terias), 44.  
*lahomius* (Logania), 202.  
*lahomius* (Miletus), 202.  
*liaus* (Chilades), 271.  
*liaus* (Papilio), 271.  
*lalage* (Papilio), 84.  
*lalassis* (Lade), 1.  
*lalassis* (Pieris), 1.  
*lambi* (Lycenopsis), 226.  
*lambi* (Cyaniris), 226.  
*lanka* (Lycenopsis), 216.  
*lanka* (Cyaniris), 216.  
*lankapura* (Calophaga), 7.  
*latifasciatus* (Ixias), 111.  
*latilimbata* (Terias), 78.  
*latimargo* (Cyaniris), 207.  
*lativitta* (Colias), 157.  
*lavendularis* (Cyaniris), 208.  
*learchus* (Gerydus), 193.  
*learchus* (Miletus), 193.

*leechi* (Colias), 164.  
*leechi* (Euryalus), 168.  
*leechi* (Colias), 168.  
*leis* (Catophaga), 14.  
*lena* (Ixias), 109.  
*leona* (Pareronia), 182.  
*leona* (Nepheronia), 182.  
*leos* (Gerydus), 193.  
*leos* (Simethus), 193.  
*Leptosia*, 19.  
*leuco* (Colias), 170.  
*leucofasciatus* (Plebeius), 271.  
*leucotheme* (Colias), 170.  
*levetti* (Lycenopsis), 226.  
*levetti* (Cyaniris), 226.  
*libythea* (Kibreeta), 36.  
*libythea* (Terias), 36.  
*lilacea* (Lycenopsis), 210.  
*lilacea* (Cyaniris), 210.  
*limbata* (Callosune), 135.  
*limbata* (Lycenopsis), 218.  
*limbatus* (Teracolus), 135.  
*limbatus* (Cyaniris), 218.  
*liukiensis* (Hebomoia), 127.  
*livilla* (Nepheronia), 176.  
*Logania*, 200.  
*lougeana* (Gerydus), 190.  
*luca* (Logania), 203.  
*luella* (Euchloa), 121.  
*ludekingii* (Ixias), 118.  
*ludekingii* (Thestias), 118.  
*lugra* (Lycenopsis), 227.  
*lugra* (Cyaniris), 227.  
*lutescens* (Pareronia), 182.  
*lutescens* (Nepheronia), 182.  
*luzoniensis* (Terias), 80.  
**LYCEINIDE**, 183.  
**LYCENOPINE**, 203–278.  
*Lycenopsis*, 203–278.  
*lyce* (Lycenopsis), 227.  
*lyce* (Cyaniris), 227.  
*lycorias* (Dercas), 30.  
*lycorias* (Rhodocera), 30.  
*lysimon* (Zizera), 258.  
*lysizone* (Lycea), 260.  
*maccassarensis* (Allotinus), 200.  
*maccassarensis* (Paragerydus), 200.  
*Madais*, 152.  
*maha* (Zizera), 253.  
*maha* (Lycea), 253.  
*mahanetra* (Taraka), 238.  
*maimon* (Papilio), 239.  
*maja* (Euryalus), 173.  
*maja* (Colias), 173.  
*majos* (Allotinus), 199.  
*malaya* (Megisba), 228.  
*malaya* (Pathalia), 228.  
*Malais*, 200.  
*malayica* (Logania), 202.  
*malum-sinicum* (Ixias), 119.

*Mancipum*, 141.  
*mandarina* (Terias), 79.  
*manluena* (Castalius), 245.  
*manluena* (Lycea), 245.  
*marcopolo* (Euryalus), 173.  
*marcopolo* (Colias), 173.  
*marginata* (Lycenopsis), 218.  
*marginata* (Cyaniris), 218.  
*marginata* (Zizera), 262.  
*marginata* (Lycea), 262.  
*maria* (Catophaga), 14.  
*maria* (Appias), 14.  
*marianne* (Ixias), 115.  
*marianne* (Thestias), 115.  
*mariesii* (Terias), 79.  
*marmorata* (Logania), 200.  
*massalia* (Logania), 202.  
*mata* (Catophaga), 14.  
*mata* (Tachyris), 14.  
*maxima* (Colias), 28.  
*maxima* (Gonepteryx), 28.  
*maximum* (Gerydus), 193.  
*maximum* (Allotinus), 199.  
*Megisba*, 227.  
*meipona* (Ixias), 113.  
*meleno* (Lycenopsis), 223.  
*meleno* (Cyaniris), 223.  
*melanory* (Gerydus), 193.  
*melanion* (Miletus), 193.  
*melos* (Allotinus), 200.  
*melos* (Paragerydus), 200.  
*merguiana* (Terias), 49, 71.  
*meridionalis* (Ixias), 115.  
*miles* (Callosune), 156.  
*miles* (Teracolus), 156.  
*Miletus*, 186.  
*Miletographa*, 194.  
*mindanaensis* (Appias), 19.  
*mindanaensis* (Gandea), 36.  
*minna* (Murtia), 90.  
*miranda* (Euryalus), 167.  
*miranda* (Colias), 167.  
*miriam* (Idmais), 155.  
*modestus* (Colotis), 143.  
*modestus* (Teracolus), 143.  
*montium* (Euryalus), 173.  
*montium* (Colias), 173.  
*moorei* (Terias), 49, 77.  
*moorei* (Everes), 269.  
*moorei* (Lycea), 269.  
*mora* (Zizera), 258.  
*morosi* (Castalius), 248.  
*morsei* (Leptophasia), 122.  
*morsei* (Lepidoptera), 122.  
*moulmeinensis* (Ixias), 113.  
*multistrigatus* (Allotinus), 195.  
*Murtia*, 80.  
*musina* (Lycenopsis), 226.  
*musina* (Cyaniris), 226.  
*musinoides* (Lycenopsis), 205.  
*nara* (Lycea), 250.  
*naraka* (Pareronia), 179.  
*naraka* (Nepheronia), 179.  
*narcissus* (Terias), 62.  
*nathalia* (Salatara), 16.  
*nathalia* (Pieris), 16.  
*naxus* (Castalius), 240.  
*nebo* (Appias), 17.  
*nebulosa* (Euryalus), 173.  
*nebulosa* (Colias), 173.  
*nebulosa* (Lycenopsis), 226.  
*nebulosa* (Cyaniris), 226.  
*nedda* (Lycenopsis), 227.  
*nedda* (Cyaniris), 227.  
*neombo* (Catophaga), 15.  
*neombo* (Pieris), 15.  
*neombo* (Catophaga), 9.  
*Neopithecop*, 229.  
*nepalensis* (Colias), 24.  
*nepalensis* (Gonepteryx), 24.  
*Nepheronia*, 174.  
*nephite* (Papilio), 97.  
*neriene* (Colias), 157, 160.  
*nero* (Tachyris), 18.  
*nero* (Pieris), 18.  
*niasana* (Castalius), 249.  
*niasica* (Pareronia), 182.  
*niasica* (Nepheronia), 182.  
*nicévillei* (Terias), 79.  
*Nichitona*, 19.  
*nicobarica* (Leptosia), 22.  
*nicobarica* (Nichitona), 22.  
*nigritus* (Allotinus), 200.  
*nigritus* (Paragerydus), 200.  
*nihana* (Pichecops), 233.  
*nikobariensis* (Terias), 49, 76.  
*nilagirensis* (Euryalus), 161.  
*nilagirensis* (Colias), 161.  
*nilgherriensis* (Colias), 161.  
*nilgirensis* (Colias), 161.  
*nina* (Pontia), 20.  
*nina* (Colias), 169.  
*Nirmula*, 40.  
*nivalis* (Allotinus), 197.  
*nivalis* (Miletus), 197.  
*nola* (Ixias), 117.  
*Notarthrius*, 203.  
*nouna* (Callosune), 156.  
*nouna* (Anthocharis), 156.  
*nubilus* (Spalgis), 236.  
*nyseus* (Talicada), 276.  
*nyseus* (Polyommatus), 276.  
*obscura* (Logania), 203.  
*obscurus* (Logania), 202.  
*obscurus* (Allotinus), 202.  
*ochreipennis* (Teracolus), 149.  
*octavie* (Pareronia), 182.  
*octavie* (Eronia), 182.  
*oder* (Pareronia), 182.  
*oder* (Nepheronia), 182.

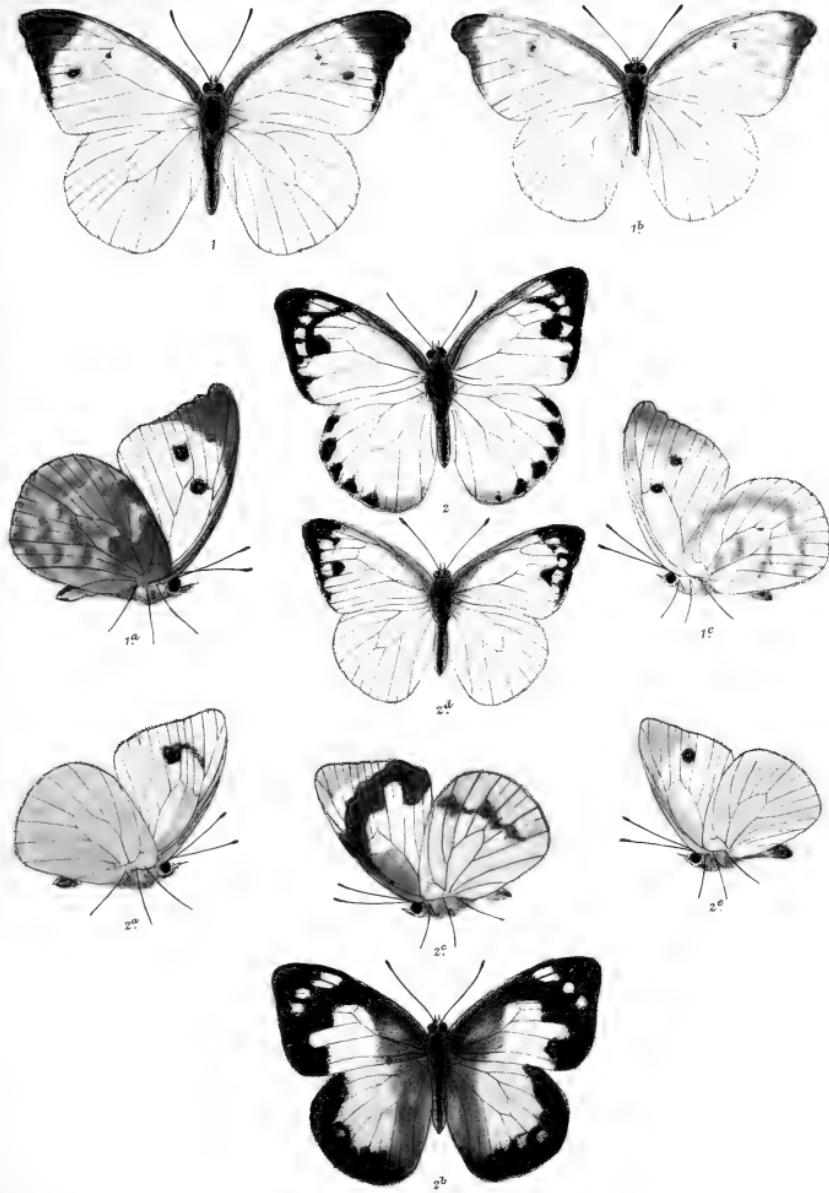
opalina (*Zizera*), 262.  
opalina (*Lycena*), 262.  
oreana *Lycenopsis*), 206.  
oreas (*Lycenopsis*), 226.  
ores (*Cyaniris*), 226.  
*oriens* (*Teracolus*), 153.  
*oriens* (*Zizera*), 262.  
orientalis (*Euchloë*), 122.  
orientalis (*Anthocharis*), 122.  
ossa (*Zizera*), 255.  
otis (*Zizera*), 260.  
owgarra (*Lycenopsis*), 227.  
owgarra (*Cyaniris*), 227.  
paetus (*Allotinus*), 200.  
paetus (*Paragerydus*), 200.  
palawana (*Pareronia*), 182.  
palawana (*Nepheronia*), 182.  
palawanica (*Gandaca*), 36.  
palawanica (*Terias*), 36.  
*pallens* (*Teracolus*), 130.  
*pallens* (*Colias*), 173.  
*pallida* (*Ixias*), 111.  
*palliseri* (*Teracolus*), 154.  
*pallitana* (*Terias*), 41.  
panda (*Saletara*), 16.  
panda (*Pieris*), 16.  
*pandu* (*Symetha*), 187.  
panoramicus (*Allotinus*), 197.  
*panthea* (*Tachyris*), 16.  
*Paragerydus*, 194.  
*Parapithecos*, 229.  
Pareronia, 174.  
parrhasius (*Everes*), 265.  
*parva* (*Lycena*), 273.  
*Pathalia*, 227.  
patruelis (*Terias*), 42, 73.  
paulina (*Catopthaga*), 7.  
*peelus* (*Teracolus*), 150.  
*perakana* (*Tachyris*), 19.  
*pernotata* (*Teracolus*), 132.  
persides (*Pareronia*), 182.  
persides (*Nepheronia*), 182.  
petronius (*Gerydus*), 193.  
phanospila (*Terias*), 78.  
phila (*Eurymus*), 164.  
phila (*Colias*), 164.  
*philamene* (*Idmais*), 148.  
*philippensis* (*Hebomoia*), 127.  
*philippensis* (*Ipheias*), 127.  
*philippina* (*Lycenopsis*), 226.  
*philippina* (*Cyaniris*), 226.  
*philippus* (*Miletus*), 193.  
*philomela* (*Nepheronia*), 176.  
phisadia (*Colotis*), 147.  
phisadia (*Teracolus*), 147.  
phocæa (*Pareronia*), 182.  
phocæa (*Eronia*), 182.  
*phonix* (*Pithecos*), 233.  
*phonix* (*Plebeius*), 233.

phuste (*Lycenopsis*), 227.  
phuste (*Cyaniris*), 227.  
*Pierinæ*, 1.  
pingasa (*Pareronia*), 177.  
pingasa (*Eronia*), 177.  
pirenassa (*Ixias*), 106.  
pirenassa (*Thestias*), 106.  
*pirithous* (*Papilio*), 99.  
*Pithecos*, 231.  
pixus (*Allotinus*), 200.  
pixus (*Paragerydus*), 200.  
placida (*Lycenopsis*), 220.  
placida (*Cyaniris*), 220.  
placidula (*Lycenopsis*), 227.  
placidula (*Cyaniris*), 227.  
planta (*Lycenopsis*), 227.  
planta (*Cyaniris*), 227.  
pleione (*Teracolus*), 155.  
pleione (*Pontia*), 155.  
poliographus (*Eurymus*), 173.  
poliographus (*Colias*), 173.  
*polycaeste* (*Pieris*), 156.  
*polysperchon* (*Papilio*), 263.  
*Pontia*, 19, 97.  
portunus (*Allotinus*), 200.  
portunus (*Paragerydus*), 200.  
potanini (*Everes*), 268.  
potanini (*Lycena*), 268.  
*prominens* (*Cyaniris*), 211.  
protomedia (*Teracolus*), 155.  
protomedia (*Pontia*), 155.  
protractus (*Colotis*), 146.  
protractus (*Teracolus*), 146.  
pryeri (*Artopœtes*), 227.  
pryeri (*Lycena*), 227.  
*pseudovanthe* (*Teracolus*), 130.  
*pseudoletta* (*Nirmula*), 44.  
*psittacus* (*Lycena*), 250.  
puellaris (*Colotis*), 149.  
puellaris (*Teracolus*), 149.  
punctatus (*Allotinus*), 200.  
punctatus (*Paragerydus*), 200.  
purrea (*Terias*), 49, 56.  
*purus* (*Teracolus*), 132.  
puspa (*Lycenopsis*), 208.  
puspa (*Cyaniris*), 208.  
puspina (*Lycenopsis*), 226.  
puspina (*Plebeius*), 226.  
putli (*Chilades*), 275.  
putli (*Lycena*), 275.  
*pygmæa* (*Ixias*), 101.  
*pygmæa* (*Lycena*), 257.  
*pyranthe* (*Catopsilia*), 90.  
pyrene (*Ixias*), 99.  
*pyrites* (*Ixias*), 119.  
raebel (*Terias*), 79.  
rama (*Nirmula*), 42.  
rama (*Terias*), 42.  
ramosa (*Tachyris*), 19.  
ramosa (*Catopthaga*), 19.  
regina (*Logania*), 202.  
regina (*Miletus*), 202.  
*rhexia* (*Papilio*), 99.  
*rhode* (*Castalius*), 248.  
*rhode* (*Lycena*), 248.  
*Rhodocera*, 23.  
*Rhodoceridæ*, 22.  
ripte (*Lycenopsis*), 227.  
ripte (*Cyaniris*), 227.  
*roepstorfi* (*Catopthaga*), 6.  
*roepstorfi* (*Terias*), 49, 76.  
*roepstorfi* (*Hebomoia*), 126.  
*rorus* (*Teracolus*), 149.  
*rosaceus* (*Teracolus*), 153.  
*roschana* (*Colias*), 163.  
rosimon (*Castalius*), 239.  
rotundalis (*Terias*), 49, 66.  
roxana (*Castalius*), 244.  
roxus (*Castalius*), 243.  
roxus (*Lycena*), 243.  
rubella (*Terias*), 38.  
*sagina* (*Colias*), 170.  
Saletara, 15.  
*sangra* (*Polyommatus*), 260.  
*sanguinalis* (*Teracolus*), 136.  
*santana* (*Terias*), 41.  
*sareptensis* (*Colias*), 159.  
sari (*Terias*), 78.  
sarilata (*Terias*), 80.  
satadra (*Ixias*), 100.  
saxeus (*Callosune*), 156.  
saxeus (*Teracolus*), 156.  
*scolymus* (*Euchloë*), 121.  
*scolymus* (*Anthocharis*), 121.  
*scylla* (*Catopsilia*), 95.  
*selma* (*Cyaniris*), 227.  
semifusca (*Terias*), 78.  
semperi (*Catopthaga*), 14.  
semperi (*Nirmula*), 47.  
senna (*Nirmula*), 46.  
senna (*Terias*), 46.  
*separata* (*Colias*), 170.  
*seres* (*Colias*), 170.  
*sesia* (*Papilio*), 99, 115.  
shelfordi (*Lycenopsis*), 227.  
shelfordi (*Cyaniris*), 227.  
*shipkee* (*Eurymus*), 162.  
*shipkee* (*Colias*), 162.  
*sieversi* (*Eurymus*), 173.  
*sieversi* (*Colias*), 173.  
*sifanica* (*Eurymus*), 173.  
*sifanica* (*Colias*), 173.  
*sikkima* (*Nirmula*), 43.  
*sikkima* (*Lycenopsis*), 214.  
*sikkima* (*Cyaniris*), 214.  
*sikkima* (*Megisba*), 228.  
*silhetana* (*Terias*), 49, 68.  
*similis* (*Zizera*), 262.  
*similis* (*Polyommatus*), 262.  
*simoda* (*Colias*), 173.

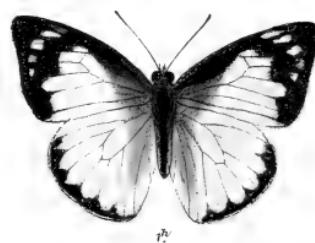
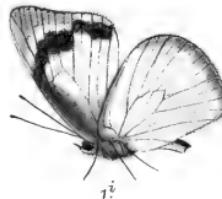
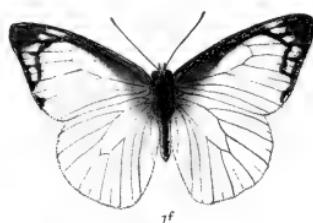
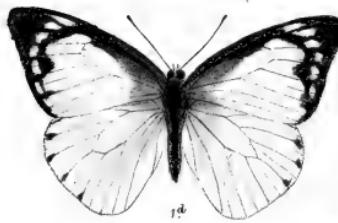
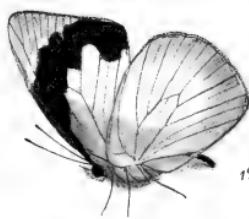
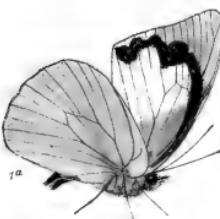
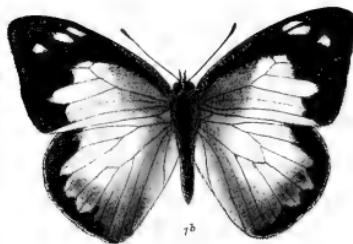
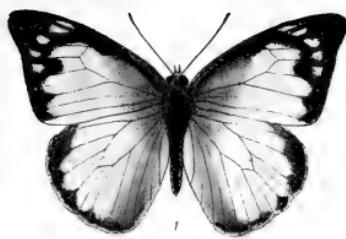
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*simulata* (Terias), 51.  
*simulatrix* (Terias), 80.  
*Sinchloë*, 120.  
*sinensis* (Terias), 79.  
*sinensis* (Leucophasia), 122.  
*sinuensis* (Leptosia), 122.  
*singalensis* (Lycenopsis), 224.  
*singalensis* (Cyaniris), 224.  
*skertchleyi* (Dercas), 32.  
*smelleni* (Terias), 78.  
*sodalis* (Terias), 69.  
*solaris* (Teracolus), 153.  
*sonchus* (Lycenopsis), 227.  
*sonchus* (Cyaniris), 227.  
*Spalgis*, 234.  
*speculifera* (Nepheronia), 181.  
*splendens* (Lycenopsis), 227.  
*splendens* (Cyaniris), 227.  
*squalida* (Zizera), 254.  
*sriva* (Logania), 202.  
*staudingeri* (Eurymus), 173.  
*staudingeri* (Colias), 173.  
*staudingeri* (Logania), 203.  
*stoliczkana* (Eurymus), 166.  
*stoliczkana* (Colias), 166.  
*strophus* (Lycenopsis), 227.  
*strophus* (Cyaniris), 227.  
*suava* (Terias), 78.  
*subaurata* (Colias), 173.  
*subdecorata* (Terias), 79.  
*subfervens* (Nirmula), 47.  
*subfervens* (Terias), 47.  
*subroseus* (Callosune), 140.  
*substrigata* (Spalgis), 236.  
*substrigata* (Lucia ?), 236.  
*substriposa* (Logania), 197.  
*subviolezens* (Allotinus), 196.  
*sulphurea* (Pieris), 16.  
*sumatrana* (Hebomoia), 127.  
*surya* (Idmais), 154.  
*swinhoei* (Catophaga), 11, 278.  
*swinhoei* (Terias), 49, 61.  
*swinhoei* (Teracolus), 156.  
*Symetha*, 186.  
*symethus* (Gerydus), 187.  
*Tachyris*, 16.  
*Talicada*, 275.  
*tamerlana* (Eurymus), 173.  
*tamerlana* (Colias), 173.  
*taplini* (Teracolus), 136.

Taraka, 236.  
*taras* (Allotinus), 199.  
*Tarucus*, 249.  
*tecmessia* (Terias), 78.  
*templetoni* (Terias), 67.  
*teos* (Gerydus), 193.  
*Terias*, 47.  
*theophrastus* (Tarucus), 249.  
*Thestias*, 97.  
*thibetana* (Euchloë), 122.  
*thibetana* (Anthocharis), 122.  
*thibetensis* (Zizera), 262.  
*thibetensis* (Lycena), 262.  
*thisorella* (Callidryas), 91.  
*thunbergi* (Anthocharis), 121.  
*thwaitesi* (Mejisba), 228.  
*thyria* (Pieris), 18.  
*tilaha* (Terias), 79.  
*titaea* (Pieris), 130.  
*titaea* (Teracolus), 130.  
*toba* (Terias), 78.  
*Tongeia*, 262.  
*tonkiniana* (Ixias), 99.  
*Trigona*, 16.  
*transpectus* (Lycenopsis), 207.  
*transpectus* (Cyaniris), 207.  
*tripuncta* (Teracolus), 154.  
*tripunctata* (Teracolus), 154.  
*trochilus* (Chilades), 273.  
*trochilus* (Lycena), 273.  
*ulysses* (Castalius), 248.  
*ulyssides* (Castalius), 248.  
*umbriel* (Everes), 269.  
*Una*, 233, 279.  
*undatus* (Ixias), 119.  
*unduliger* (Terias), 79.  
*unicolor* (Allotinus), 199.  
*uniformis* (Terias), 49, 67.  
*urania* (Dercas), 29.  
*urania* (Gonepteryx), 29.  
*usta* (Una), 233, 279.  
*usta* (Zizera ?), 233, 279.  
*vagans* (Nirmula), 47.  
*vagans* (Terias), 47.  
*Valeria*, 174.  
*valeria* (Pareronia), 182.  
*valeria* (Eronia), 182.  
*vallivolana* (Terias), 80.  
*vardhana* (Lycenopsis), 204.  
*vardhana* (Cyaniris), 204.  
*vardhana* (Notarhrinus), 204.

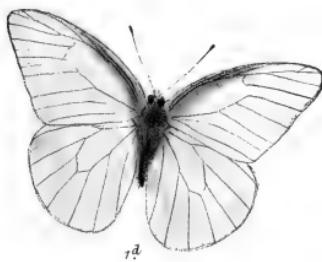
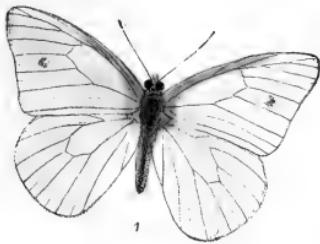
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*venata* (Nirmula), 40.  
*venata* (Terias), 40.  
*venatrix* (Thestias), 119.  
*venilia* (Ixias), 118.  
*venilia* (Pieris), 118.  
*venosa* (Euchloë), 120.  
*venosus* (Tarucus), 252.  
*venusta* (Catophaga), 9.  
*verna* (Ixias), 119.  
*vestalis* (Colotis), 150.  
*vestalis* (Teracolus), 150.  
*vi* (Madais), 156.  
*vi* (Teracolus), 156.  
*vibilia* (Leucophasia), 122.  
*victoria* (Lycenopsis), 215.  
*victoria* (Cyaniris), 215.  
*vincula* (Gerydus), 194.  
*virhuelli* (Dercas), 32.  
*virhuelli* (Colias), 32.  
*vollenhovii* (Ixias), 119.  
*vollenhovii* (Thestias), 119.  
*vossi* (Hebomoia), 127.  
*vossi* (Iphias), 127.  
*wallachii* (Dercas), 29.  
*wallachii* (Gonepteryx), 29.  
*wardi* (Catophaga), 3.  
*waterstradtii* (Allotinus), 200.  
*waterstradtii* (Paragerydus), 200.  
*waterstradtii* (Tarucus), 253.  
*watsoniana* (Logania), 201.  
*watti* (Ixias), 101.  
*wiskotti* (Eurymus), 170.  
*wiskotti* (Colias), 170.  
*xiphia* (Leptosia), 20.  
*xiphia* (Pontia), 20.  
*xiphia* (Nichetonia), 20.  
*yerburyi* (Callosune), 156.  
*yerburyi* (Teracolus), 156.  
*yunnanensis* (Ixias), 119.  
*zalmora* (Neopithecops), 230.  
*zalmora* (Pithecopis), 230.  
*zamboanga* (Pieris), 19.  
*zaneka* (Colias), 25.  
*zaneka* (Gonepteryx), 25.  
*zanekoides* (Colias), 27.  
*zanekoides* (Gonepteryx), 27.  
*zera* (Zizera), 270.  
*zinckenii* (Miletus), 187.  
*Zizera*, 253.  
*zuthus* (Everes), 269.



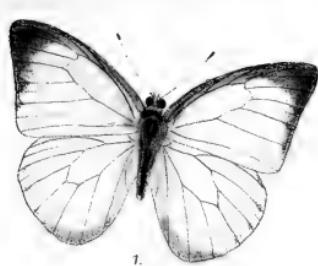




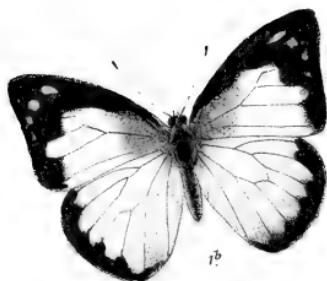








1.



1b.



1c.



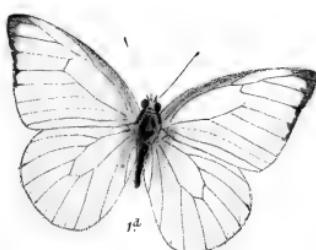
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1e.



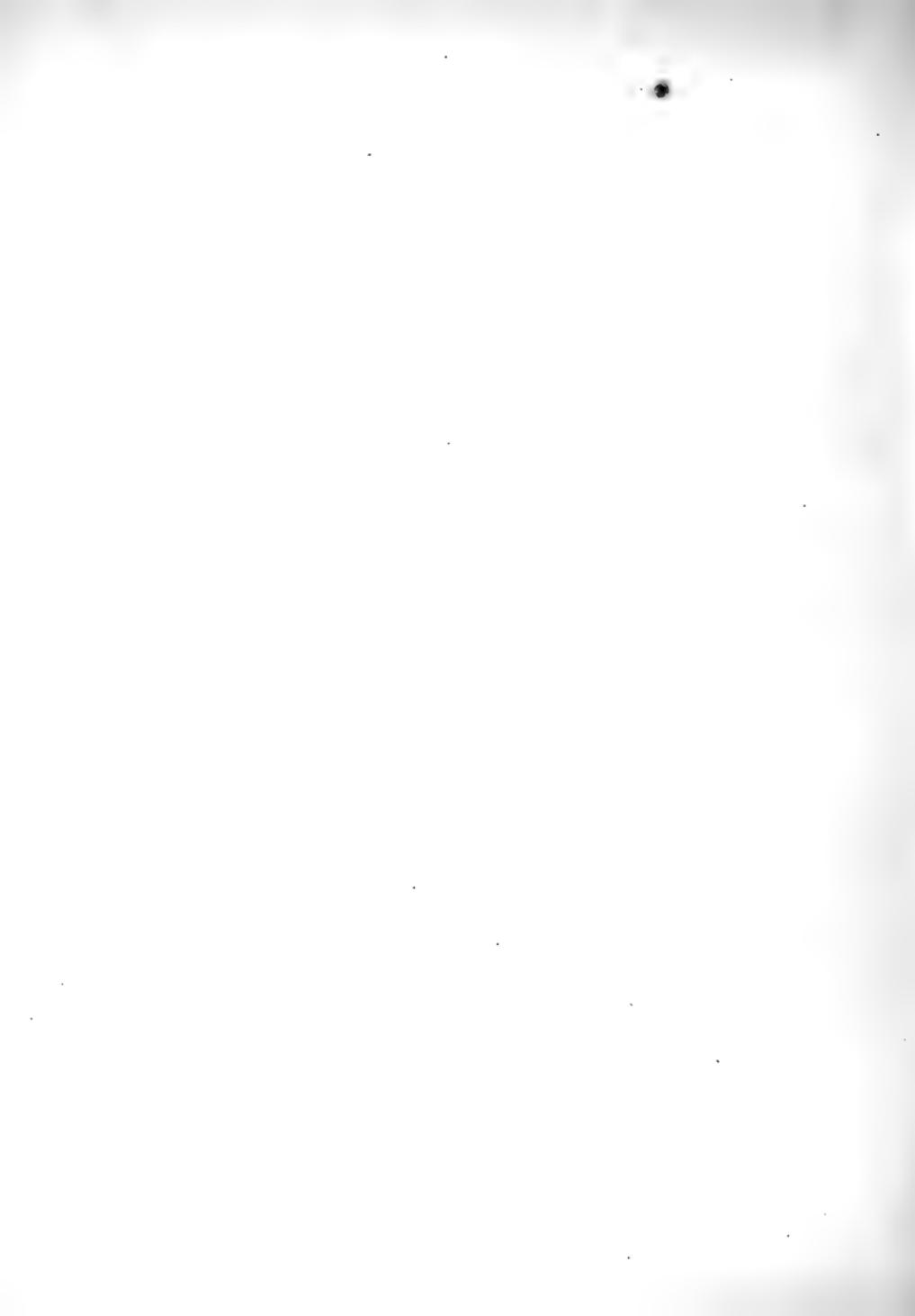
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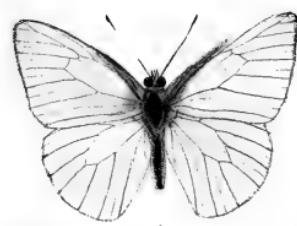


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1f.

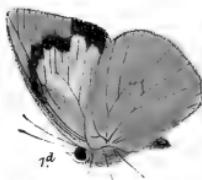




1



1b



1d



1e



1f



1c



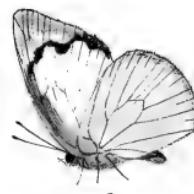
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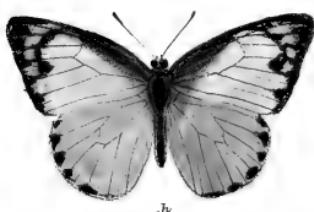
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1j



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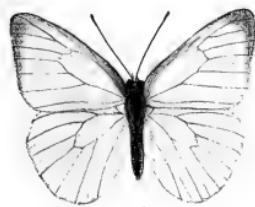


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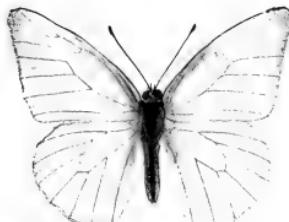


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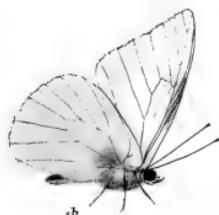




1a



1c



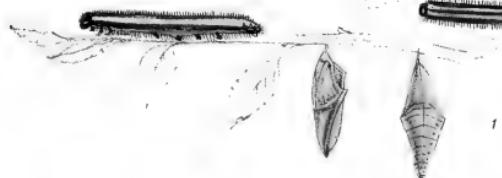
1b



1d



1e



1f



1h



1g



1j

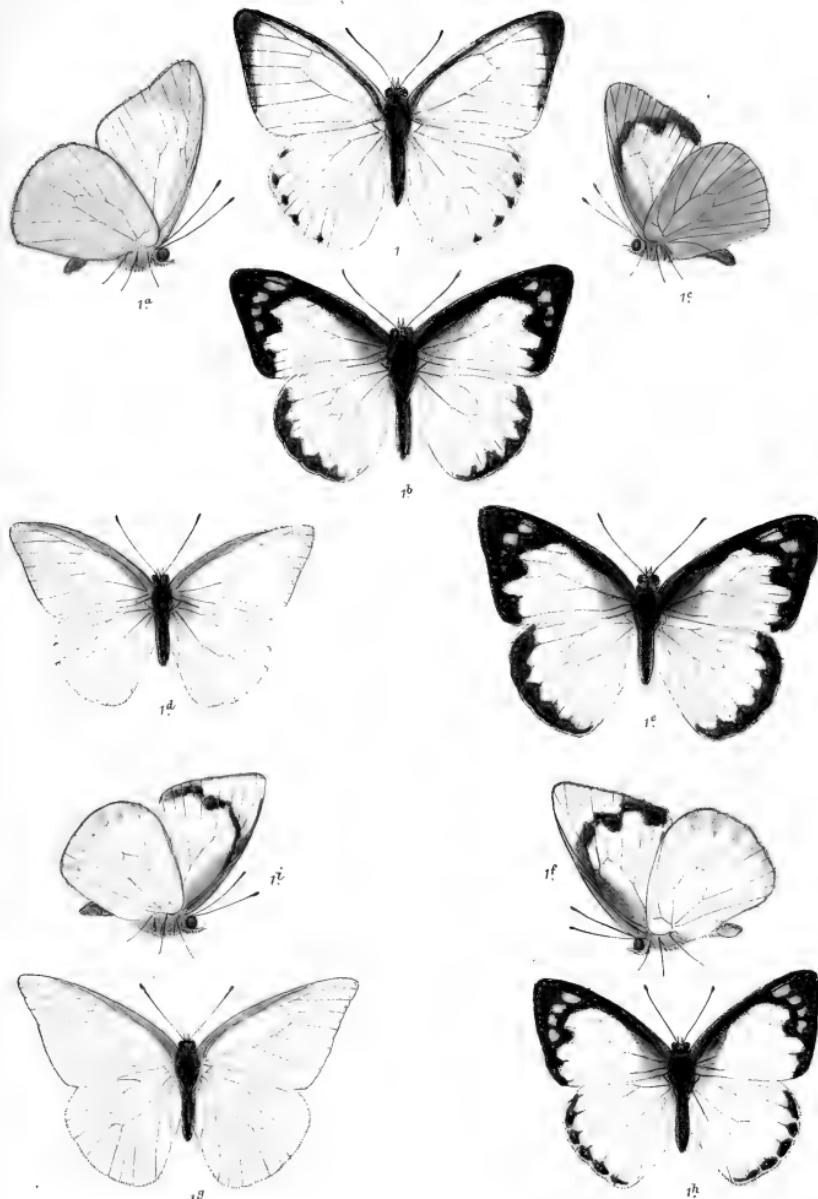


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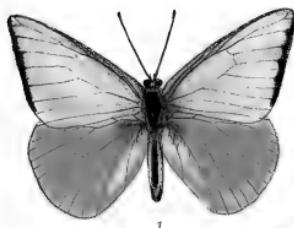


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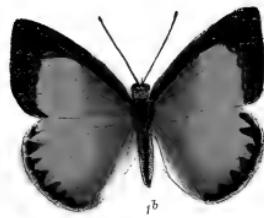








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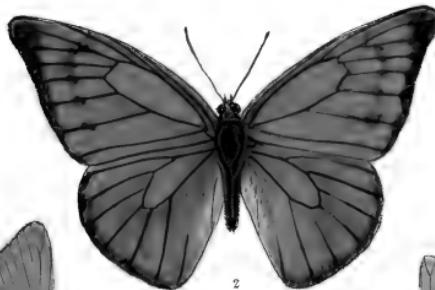
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1a



1c



2



2a



2d

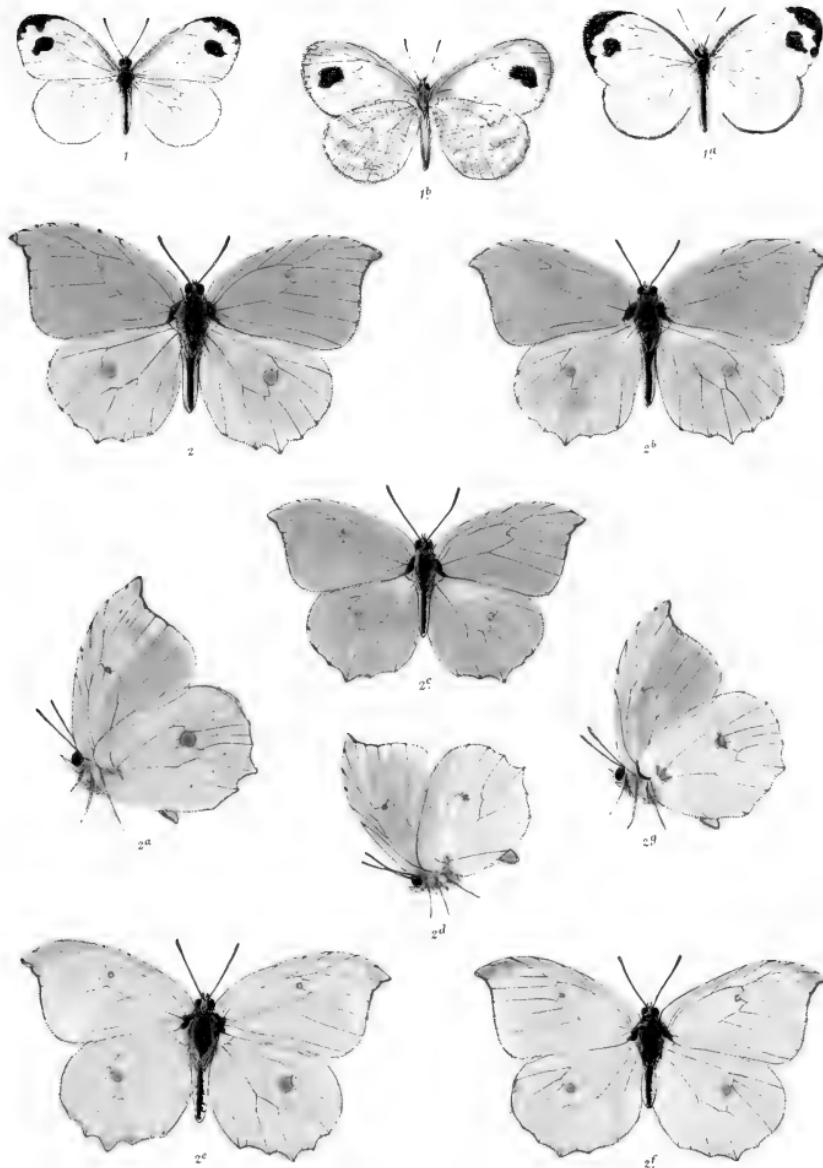


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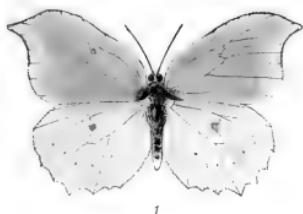


2c









1



1b



1a



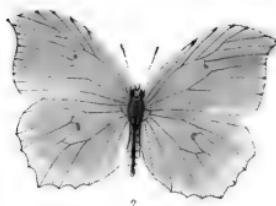
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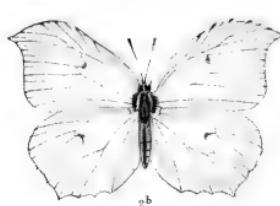
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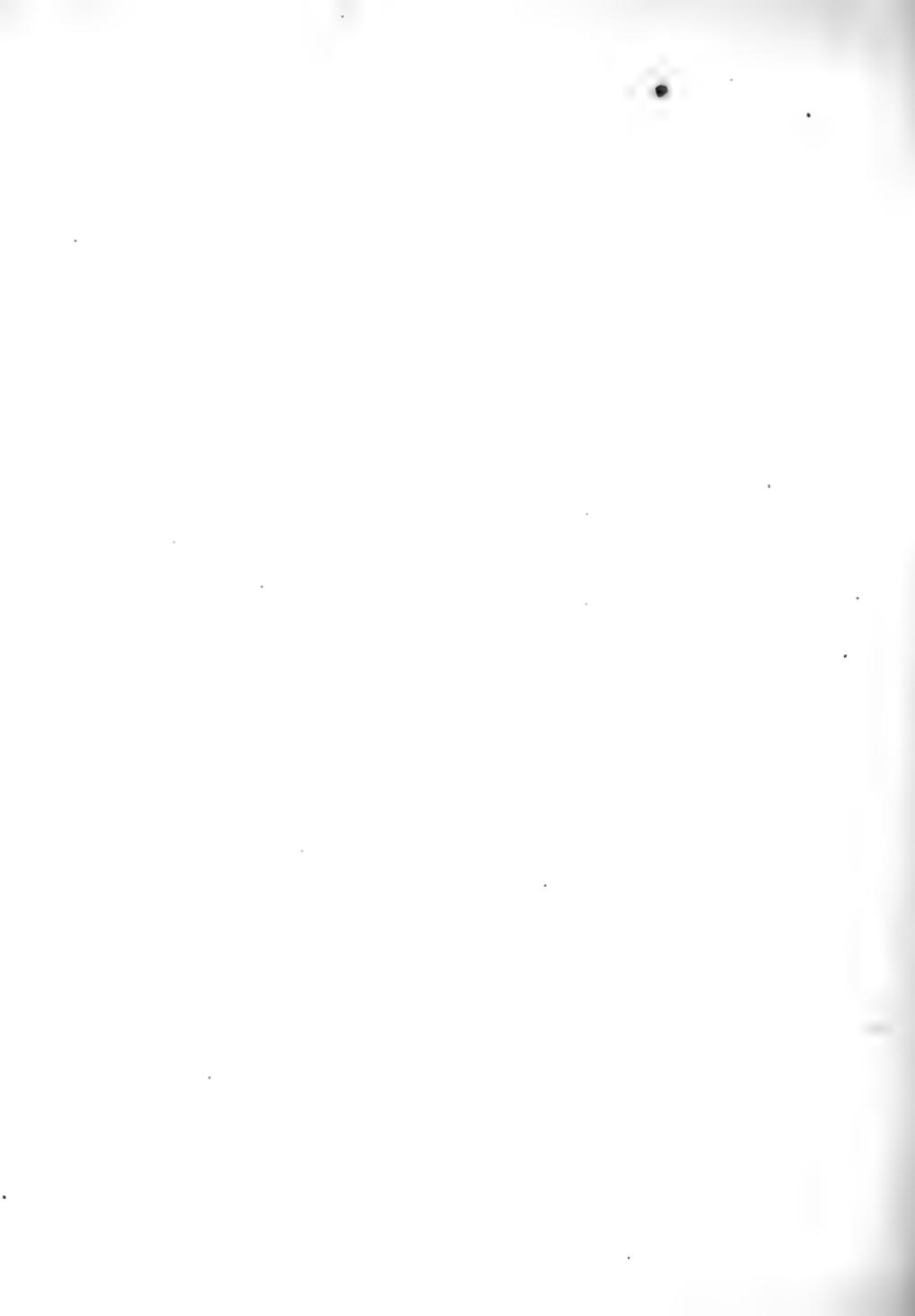
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2

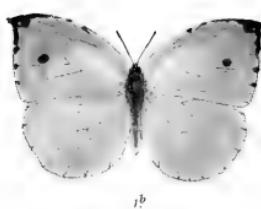


2b





1



1b



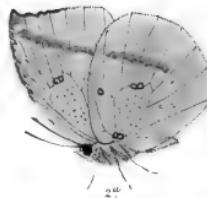
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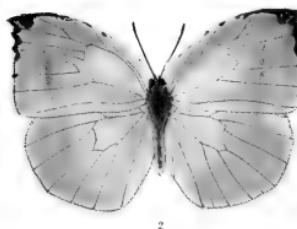
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1d

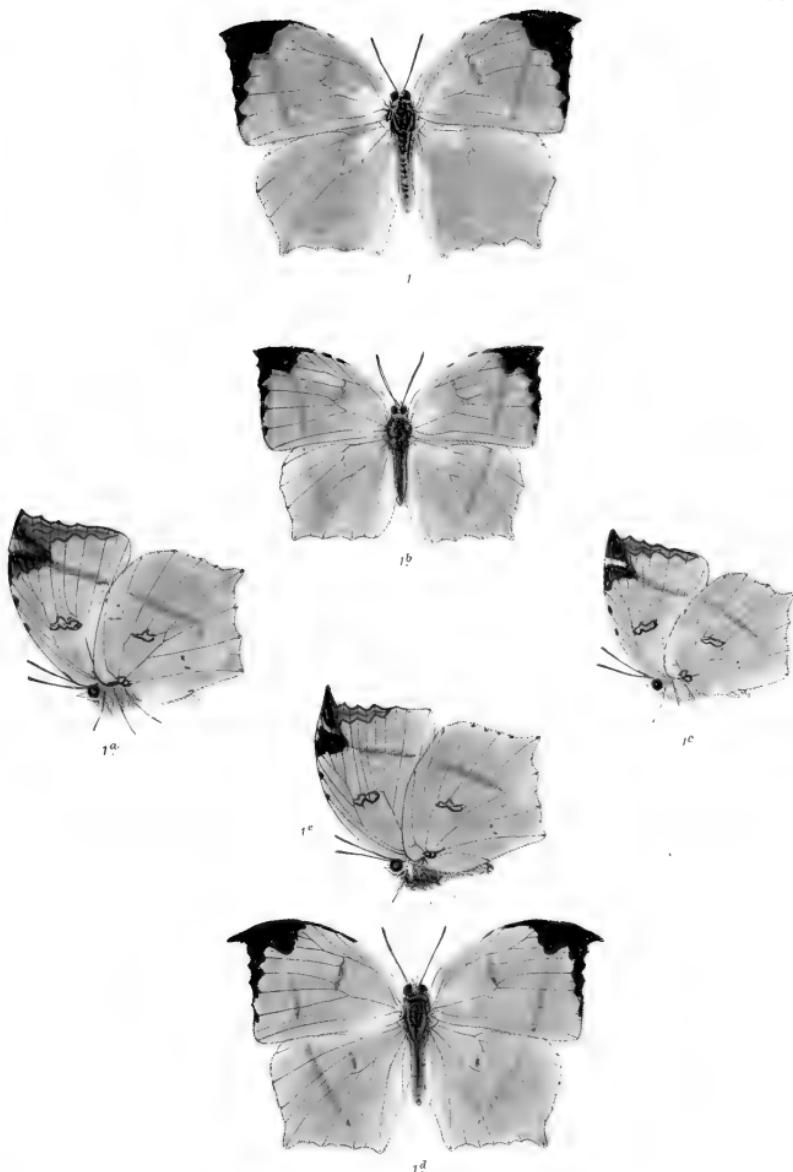


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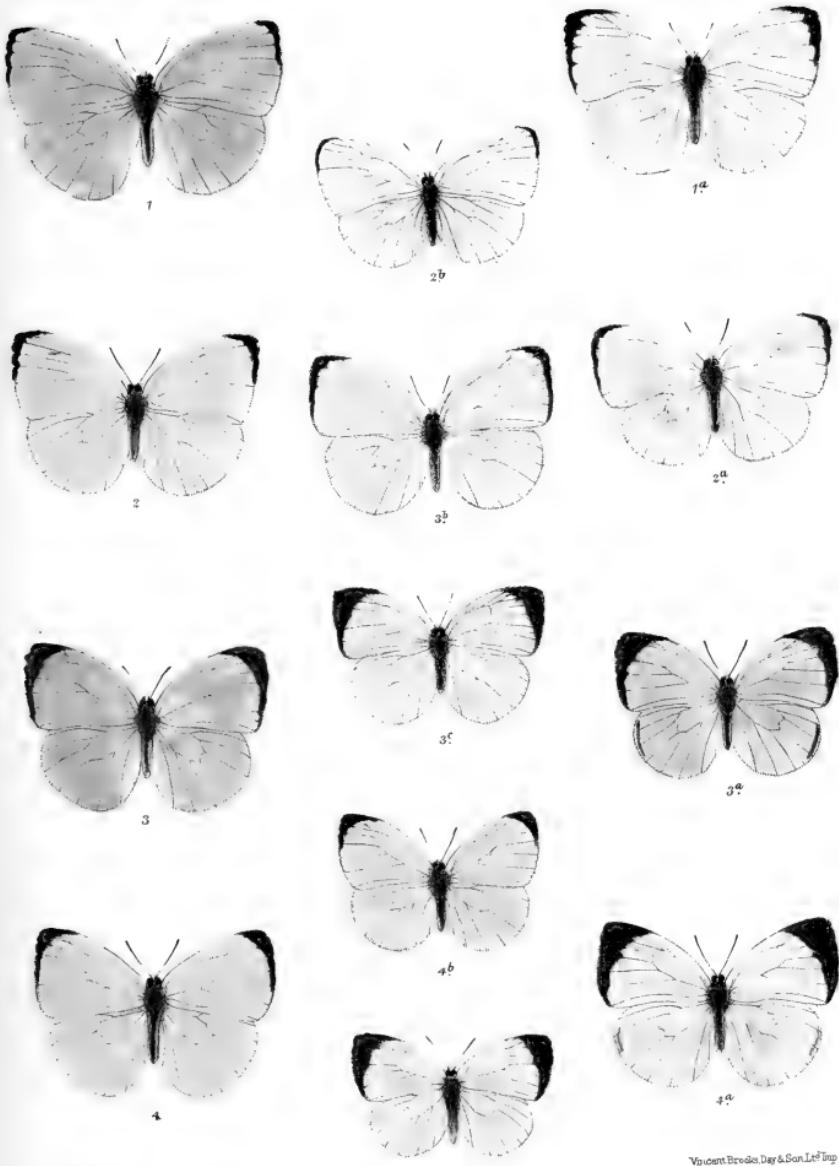


2













1.



1b



1c



1a



1e



1f



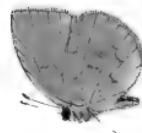
1d



1g



2



2a



2b



2d



2c



2e



2f



2g

J. N. Fitch, del. et lith.

L. Reeves & C° London.

Vincent Brooke Day & Son, Ltd. Imp.





1



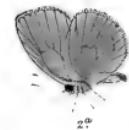
1a



1b



2



2a



2b



3



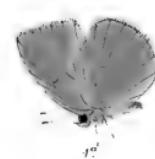
3a



3b



3c



3d



3d

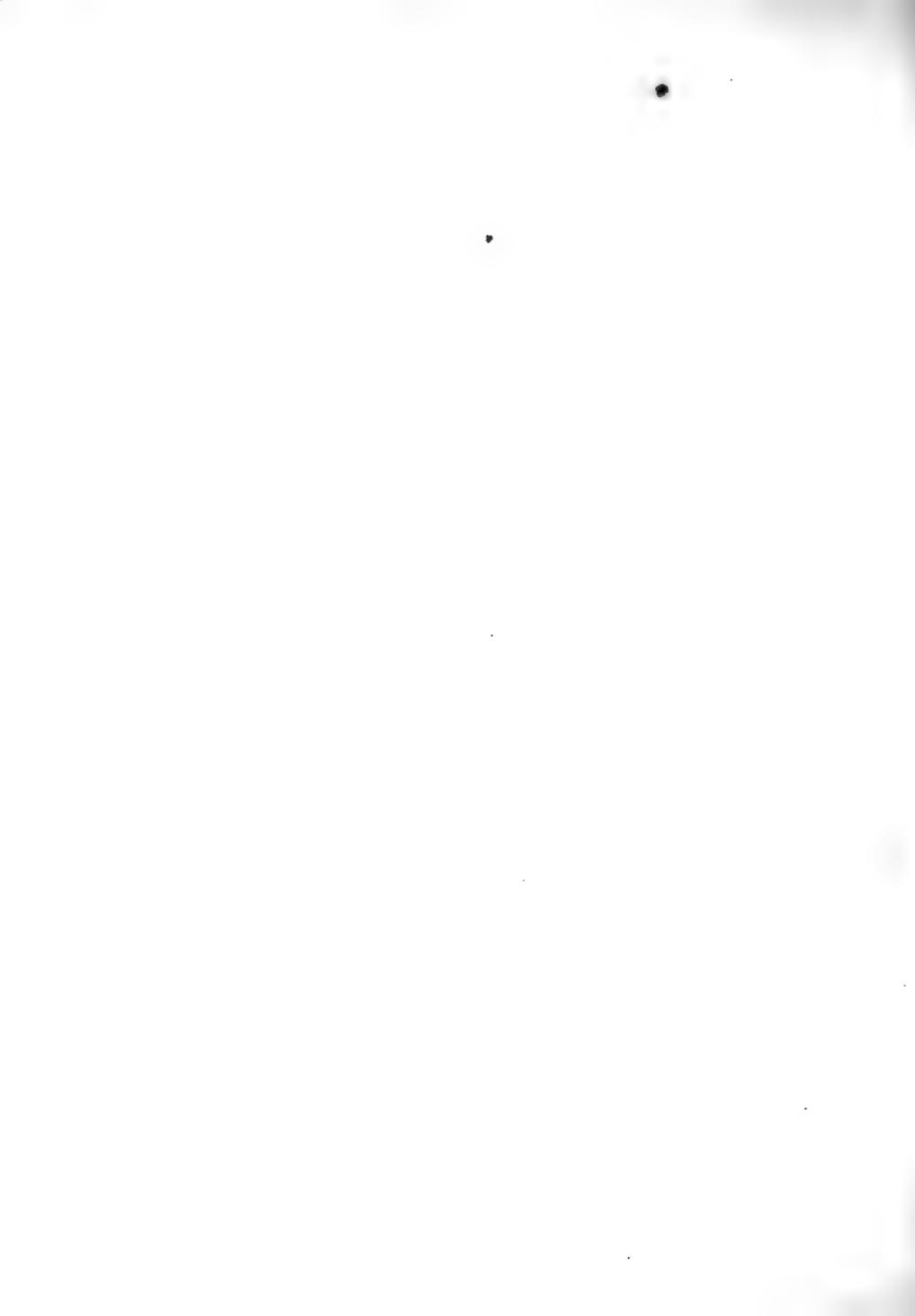


J. N. Félix. Del. & lith.



4b

Vincent Brooks Day & Son Ltd Imp

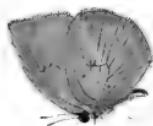




I



Ib



Ia



Ic



Id



Ie



If



Ig



Ih



Ii



Ik

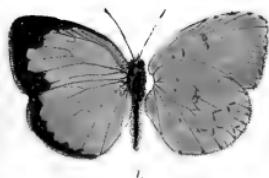


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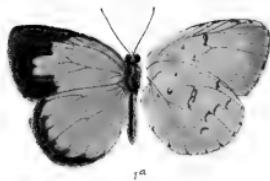


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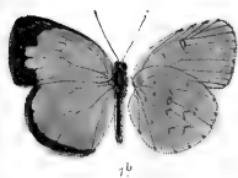




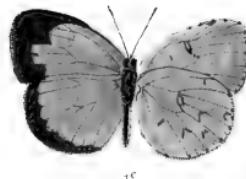
L.



T<sup>a</sup>



T<sup>b</sup>



T<sup>c</sup>



T<sup>d</sup>



T<sup>e</sup>



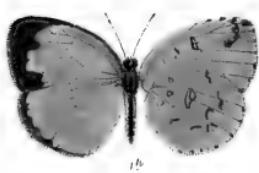
T<sup>f</sup>



T<sup>g</sup>



T<sup>h</sup>



T<sup>i</sup>

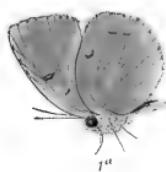


T<sup>j</sup>





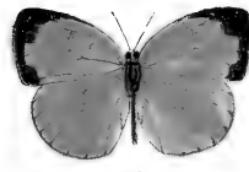
1



1a



1b



2



2a



2b



3



3a



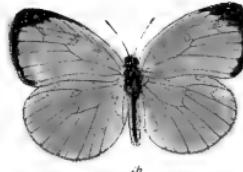
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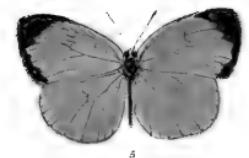
4



4a



4b



5

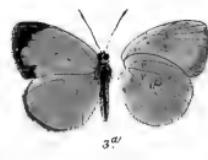
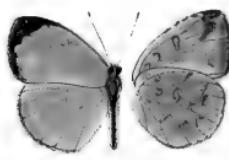
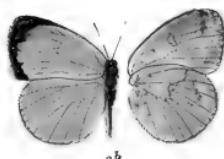
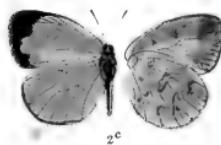
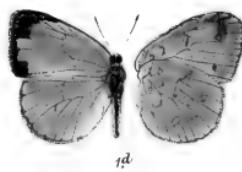
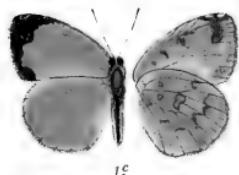
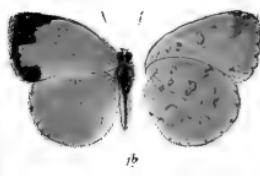
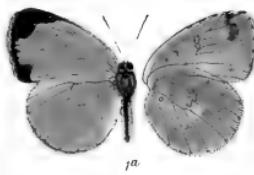
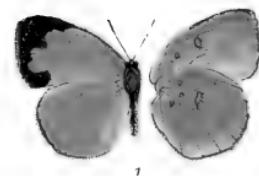


5a



5b

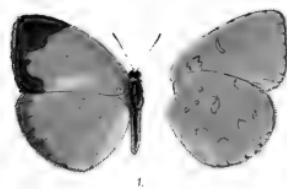




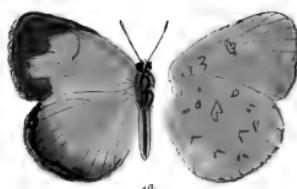
J. N. Finch del. et lith.

Vincent Brooks Day & Son, Ld Imp.

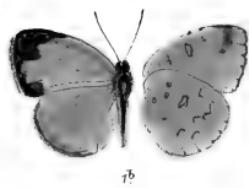




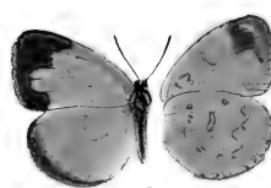
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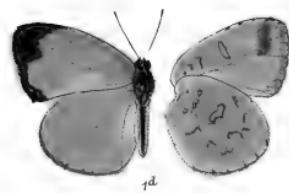
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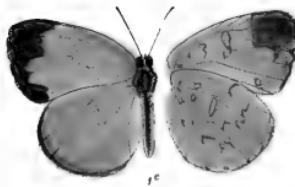
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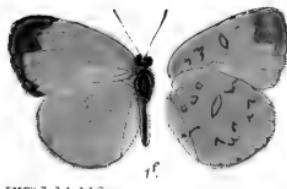
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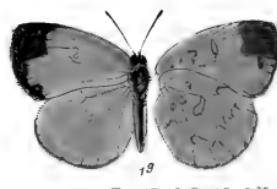


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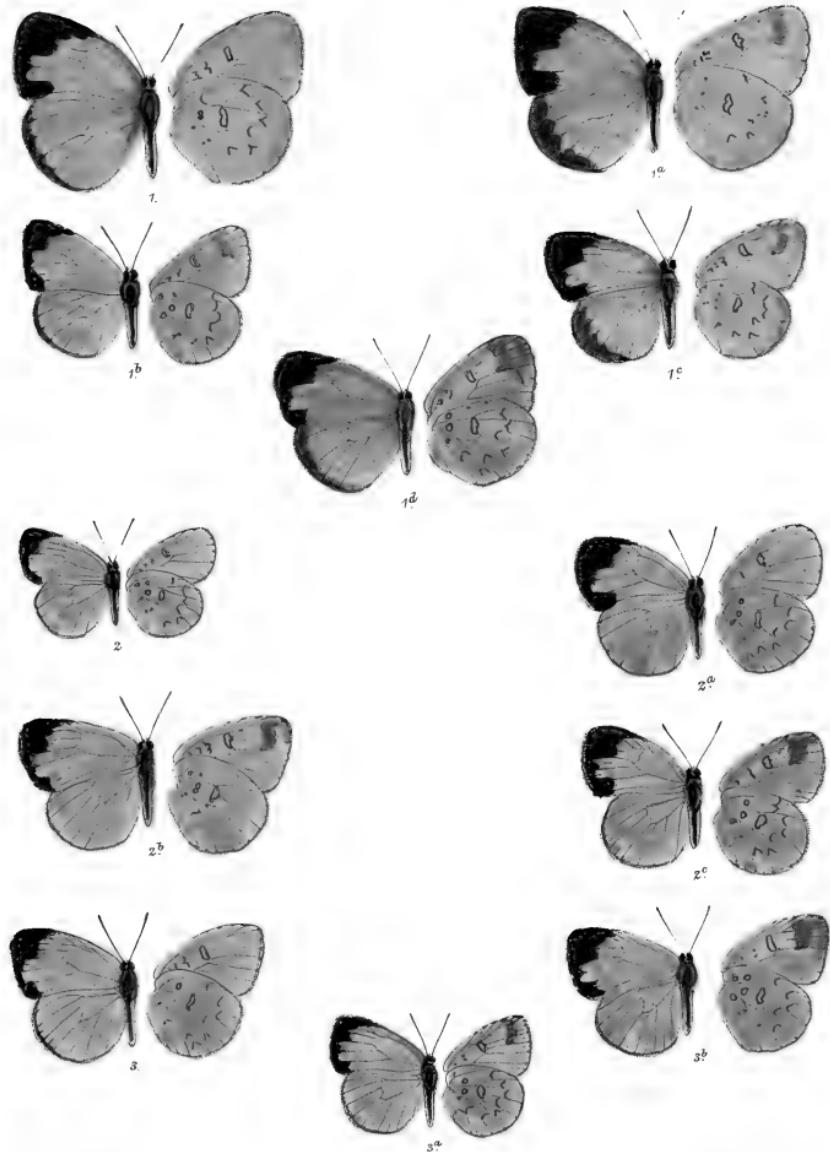
J. N. Pitch. del. et lith.



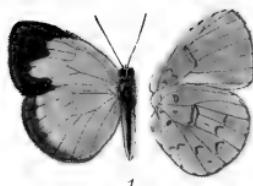
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Vincent Brooks Day & Son. Ltd. Imp.

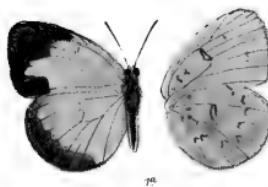




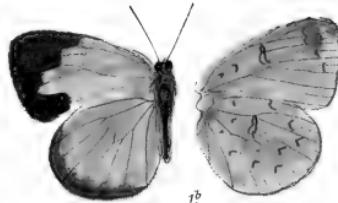




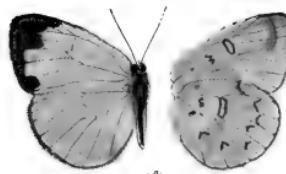
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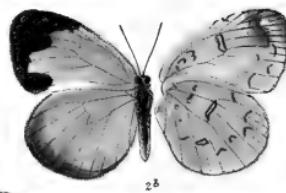
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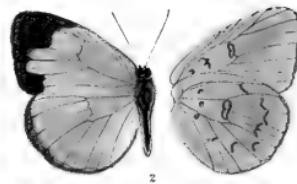
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2a



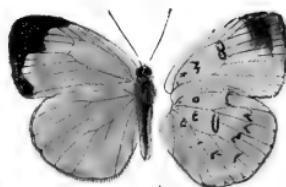
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2



2c



2d

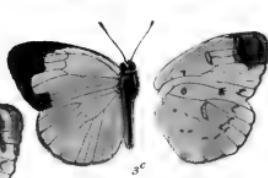
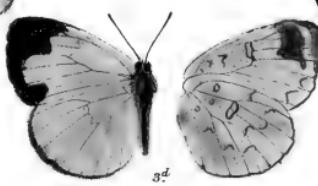
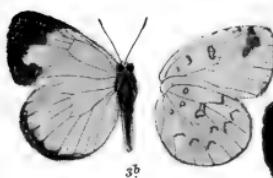
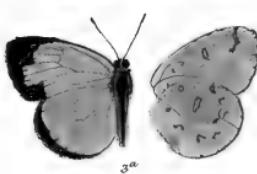
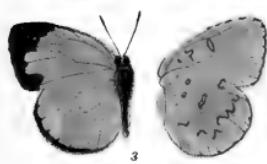
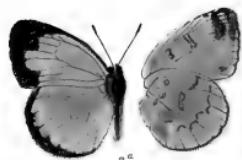
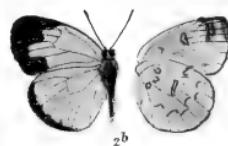
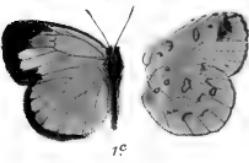
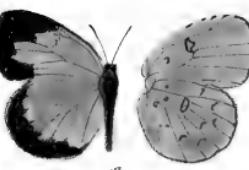
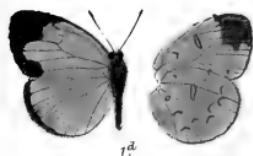
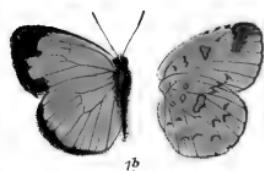
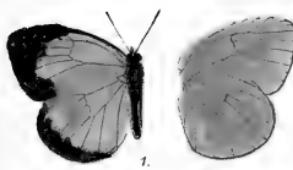


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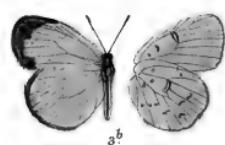
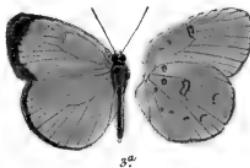
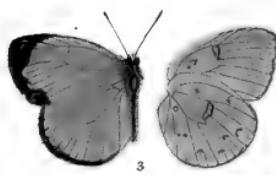
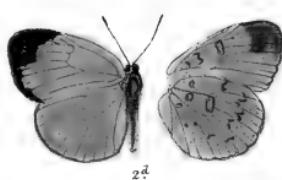
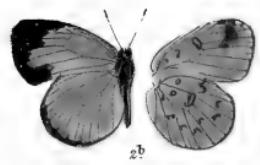
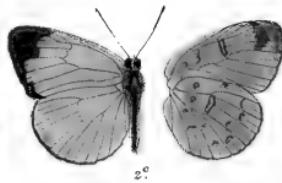
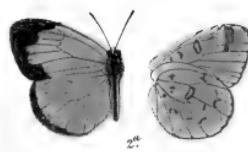
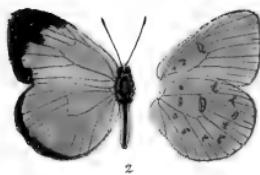
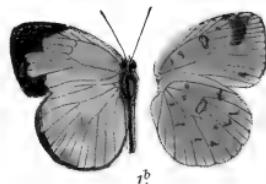
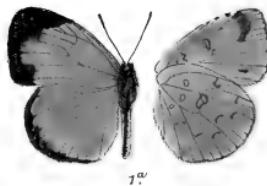
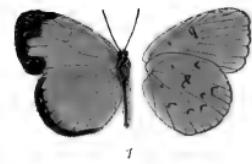
J. N. Fitch del. et lith.

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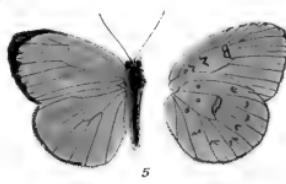
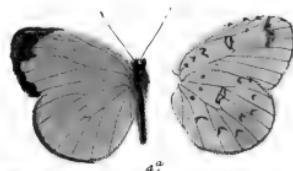
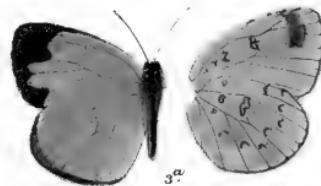
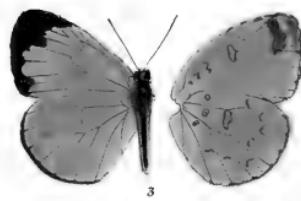
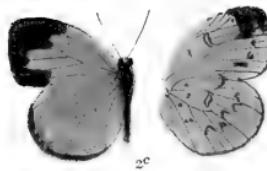
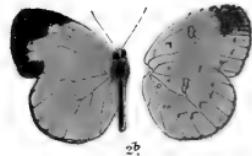
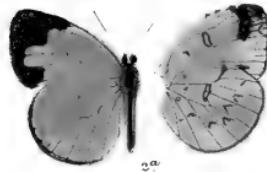
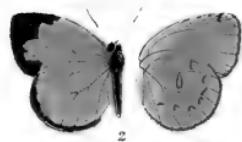
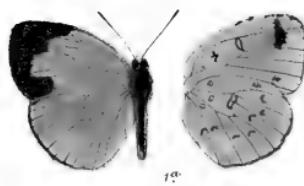
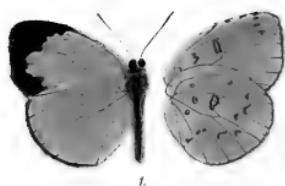


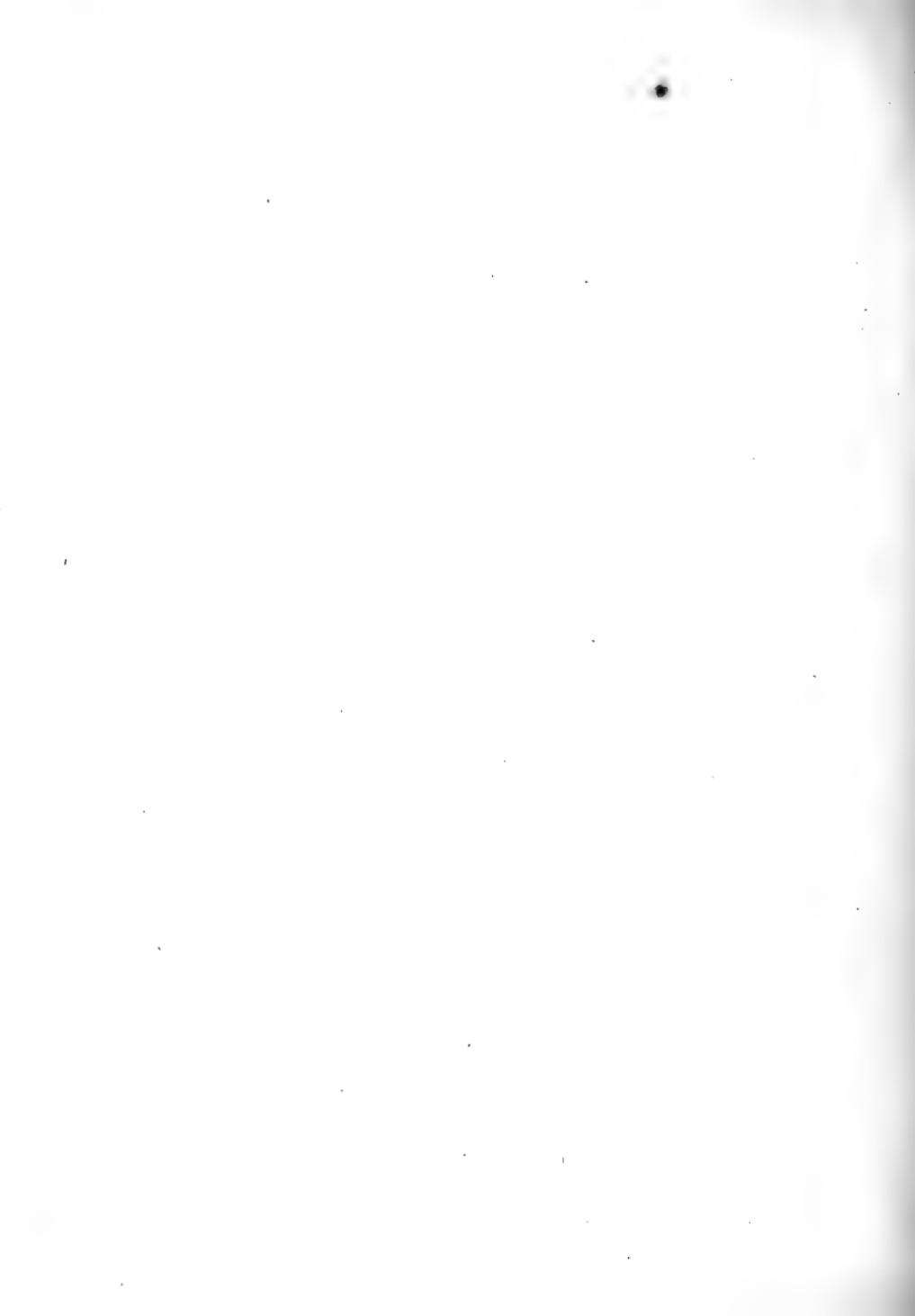


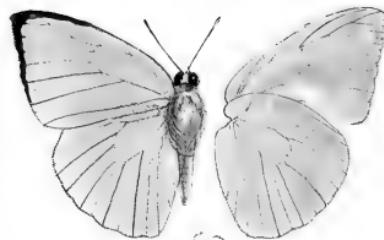




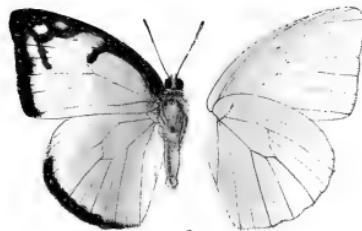








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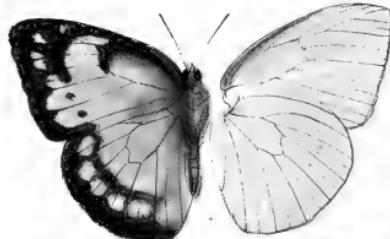


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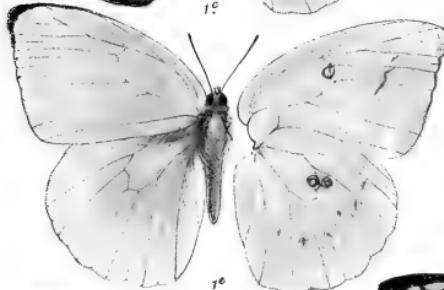
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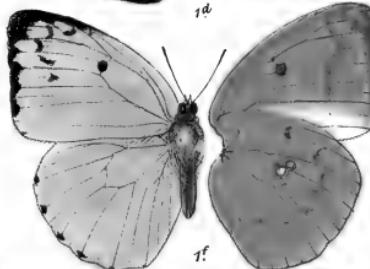
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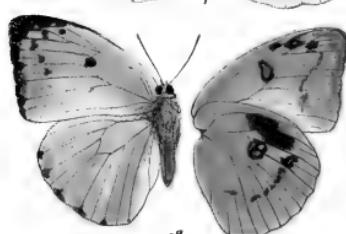


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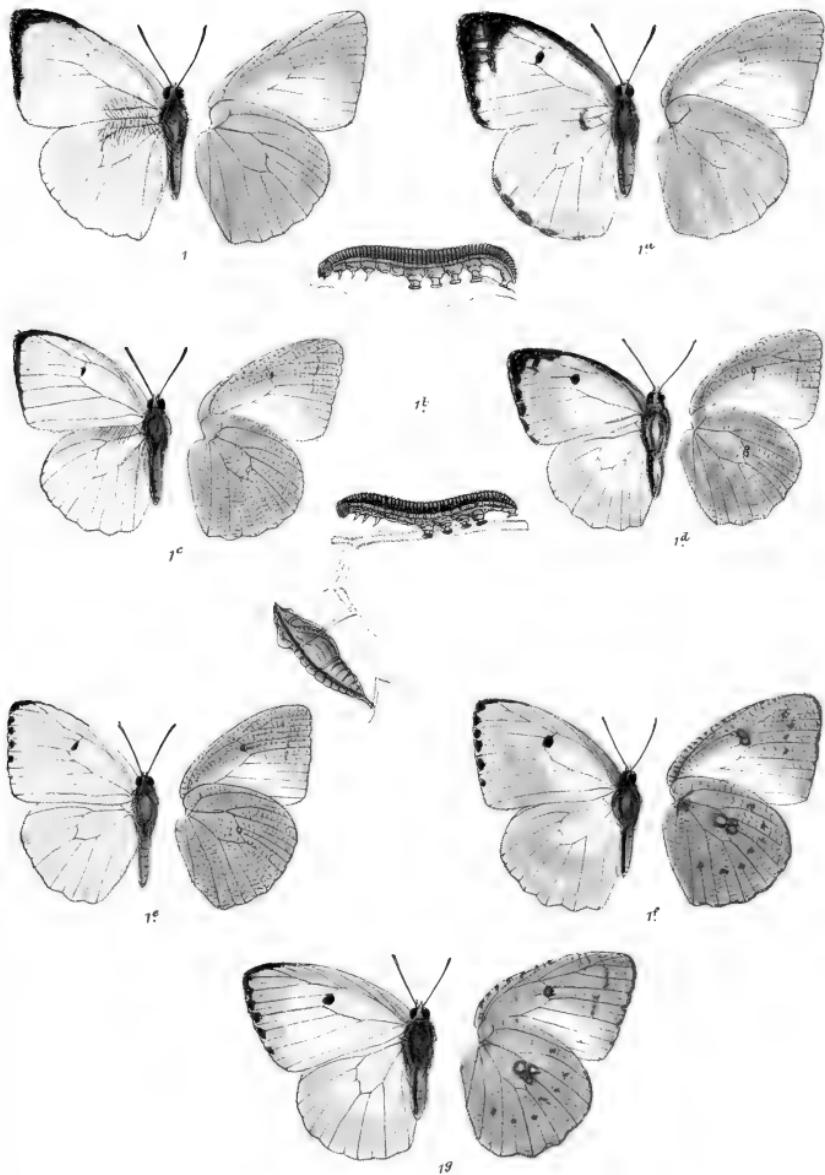
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1g.



1h.





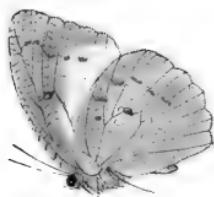




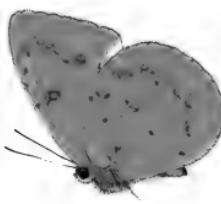
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1<sup>a</sup>



1<sup>b</sup>



2<sup>b</sup>

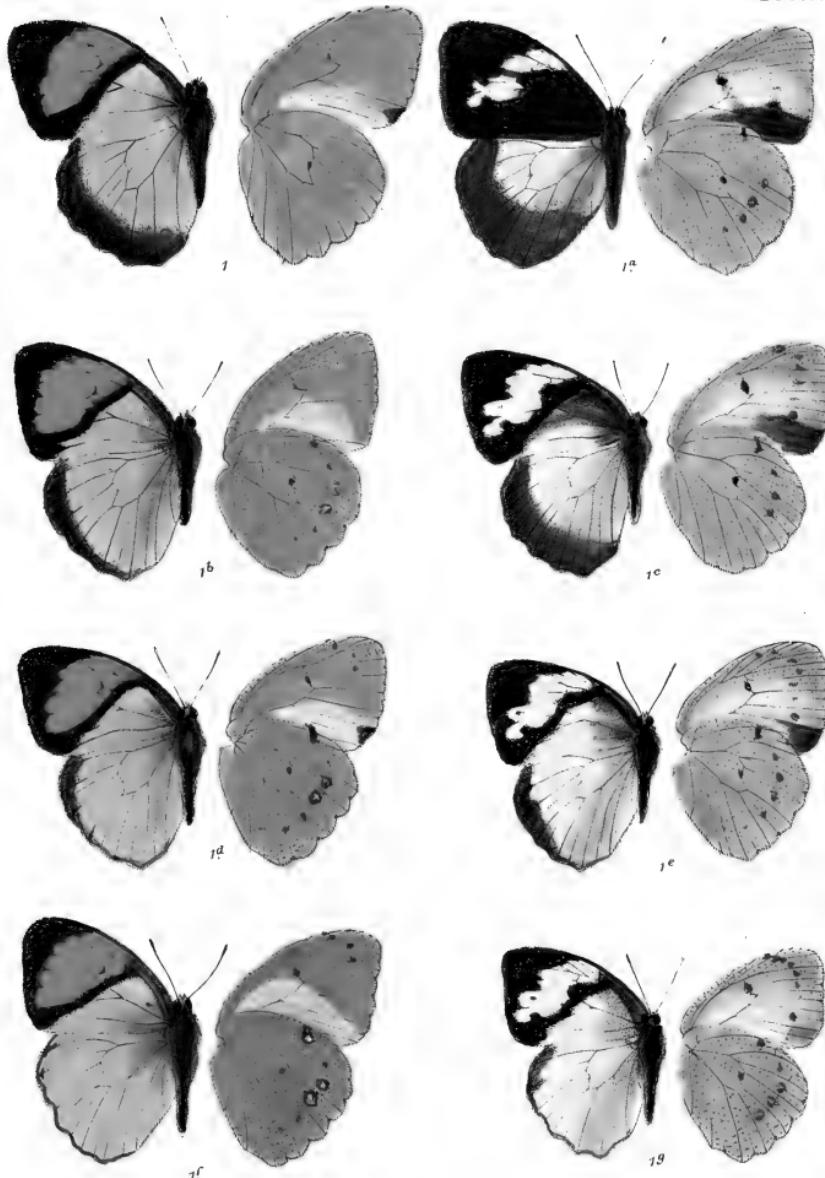


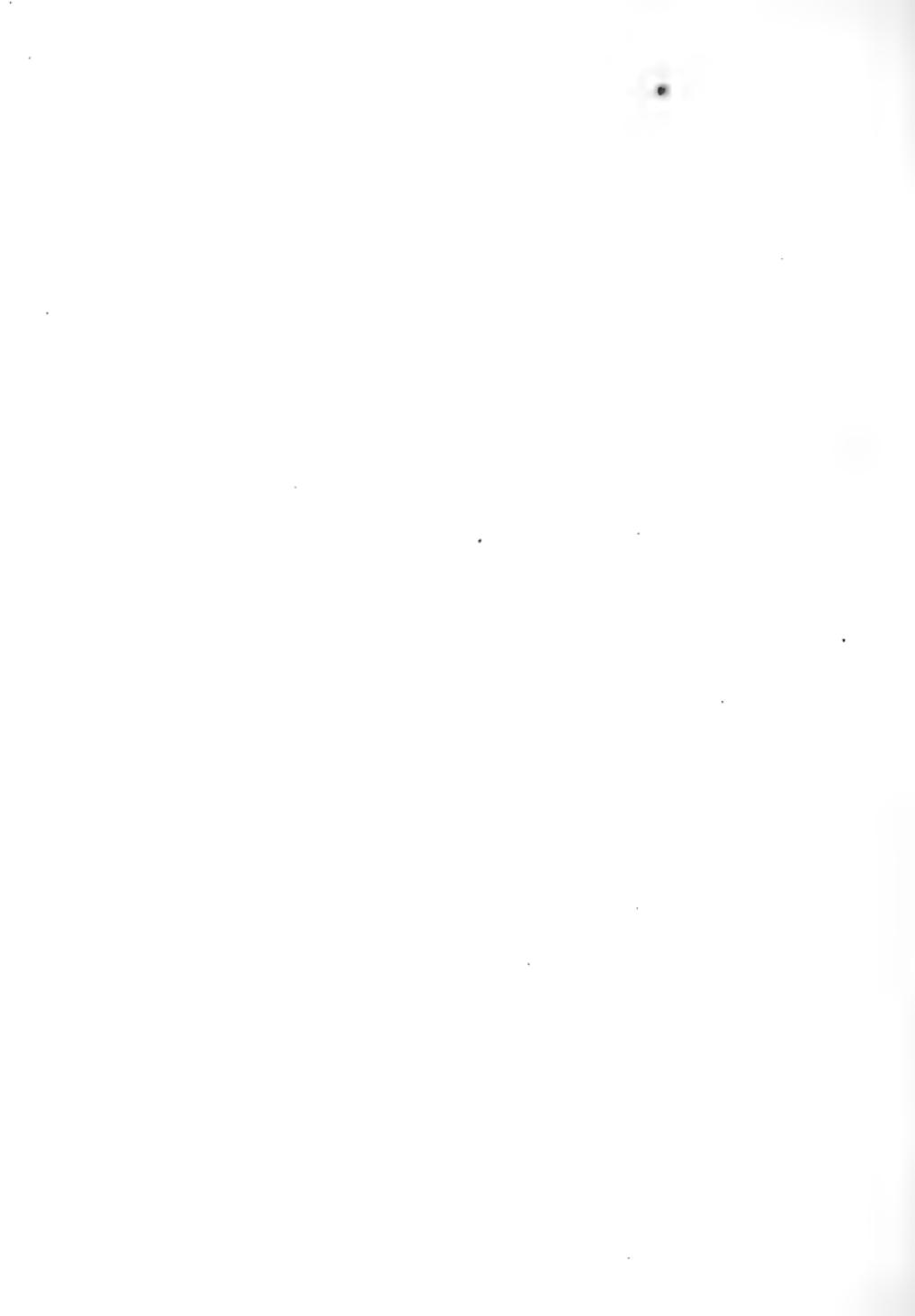
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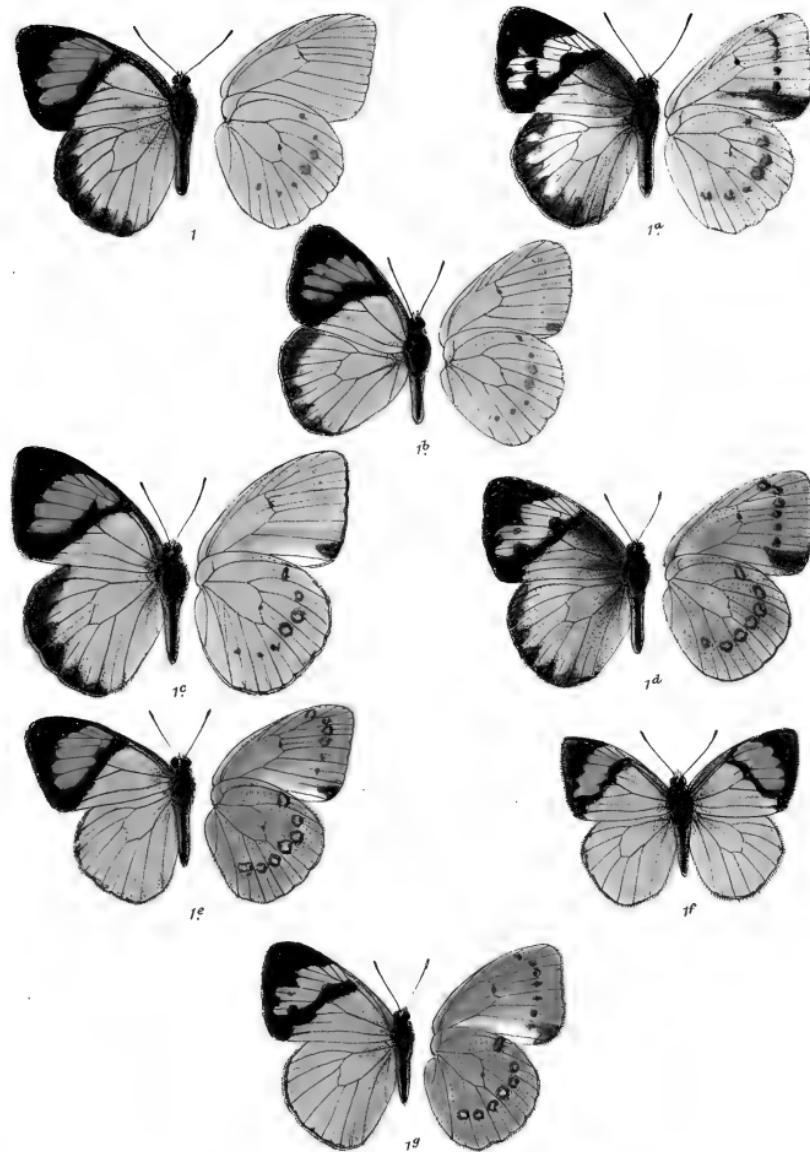


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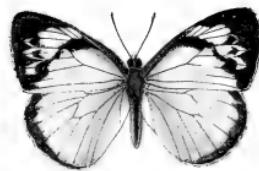




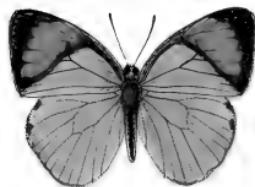




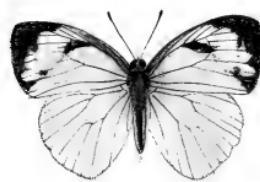
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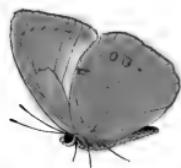
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1b



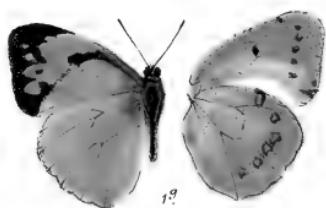
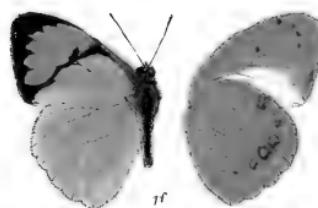
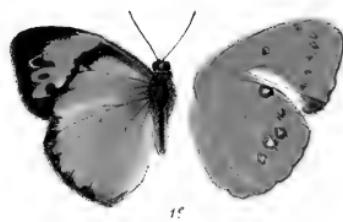
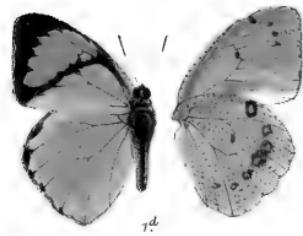
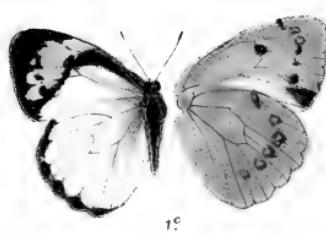
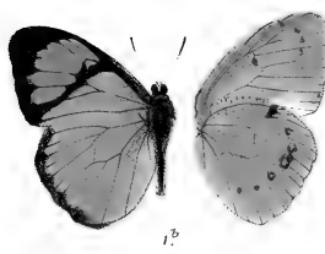
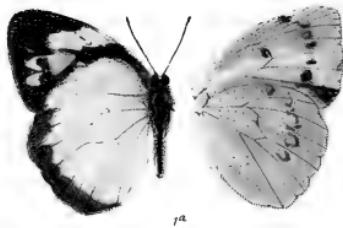
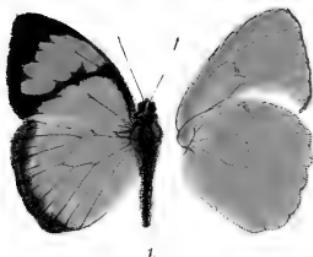
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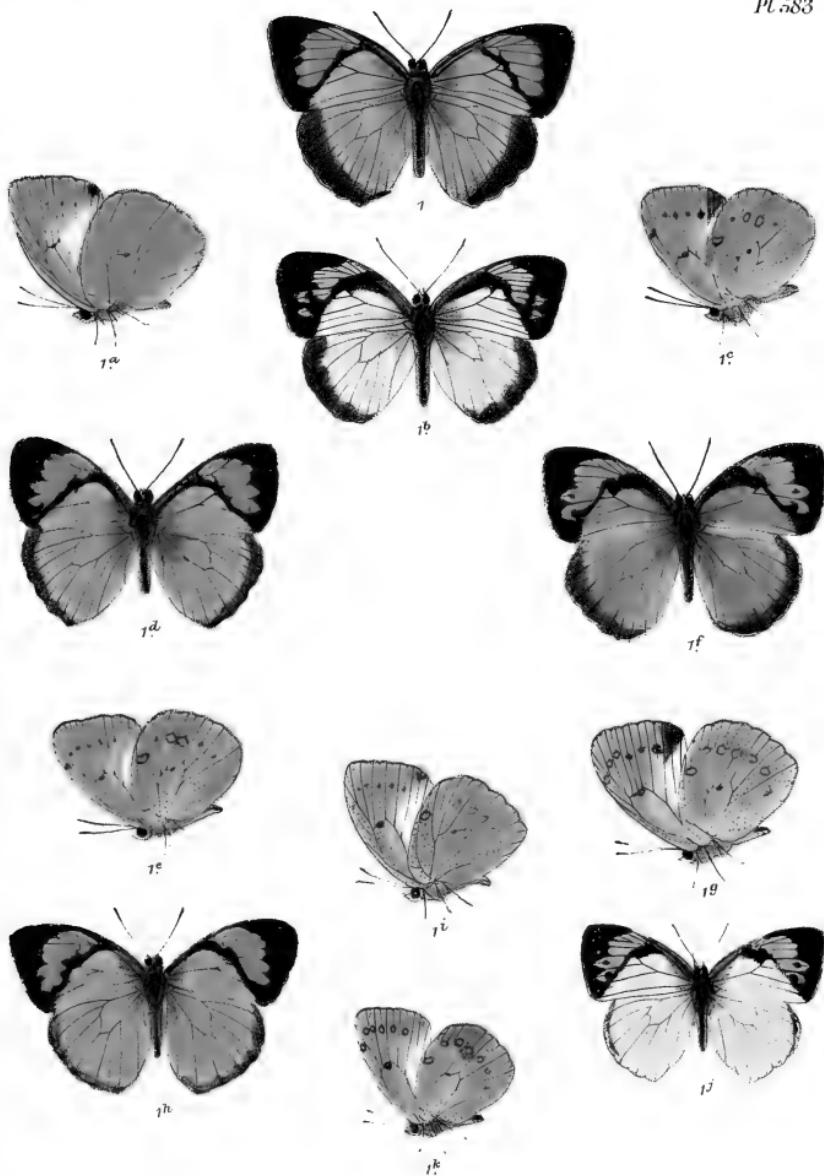
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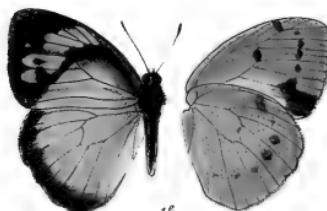
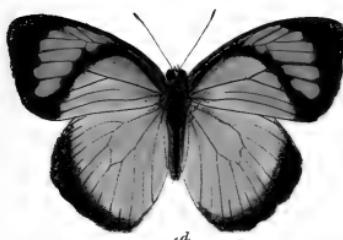
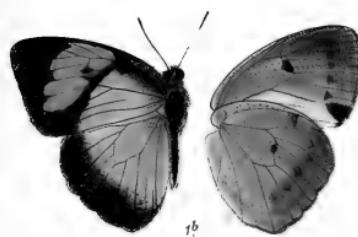
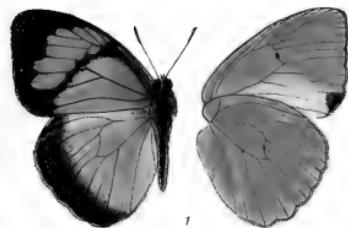


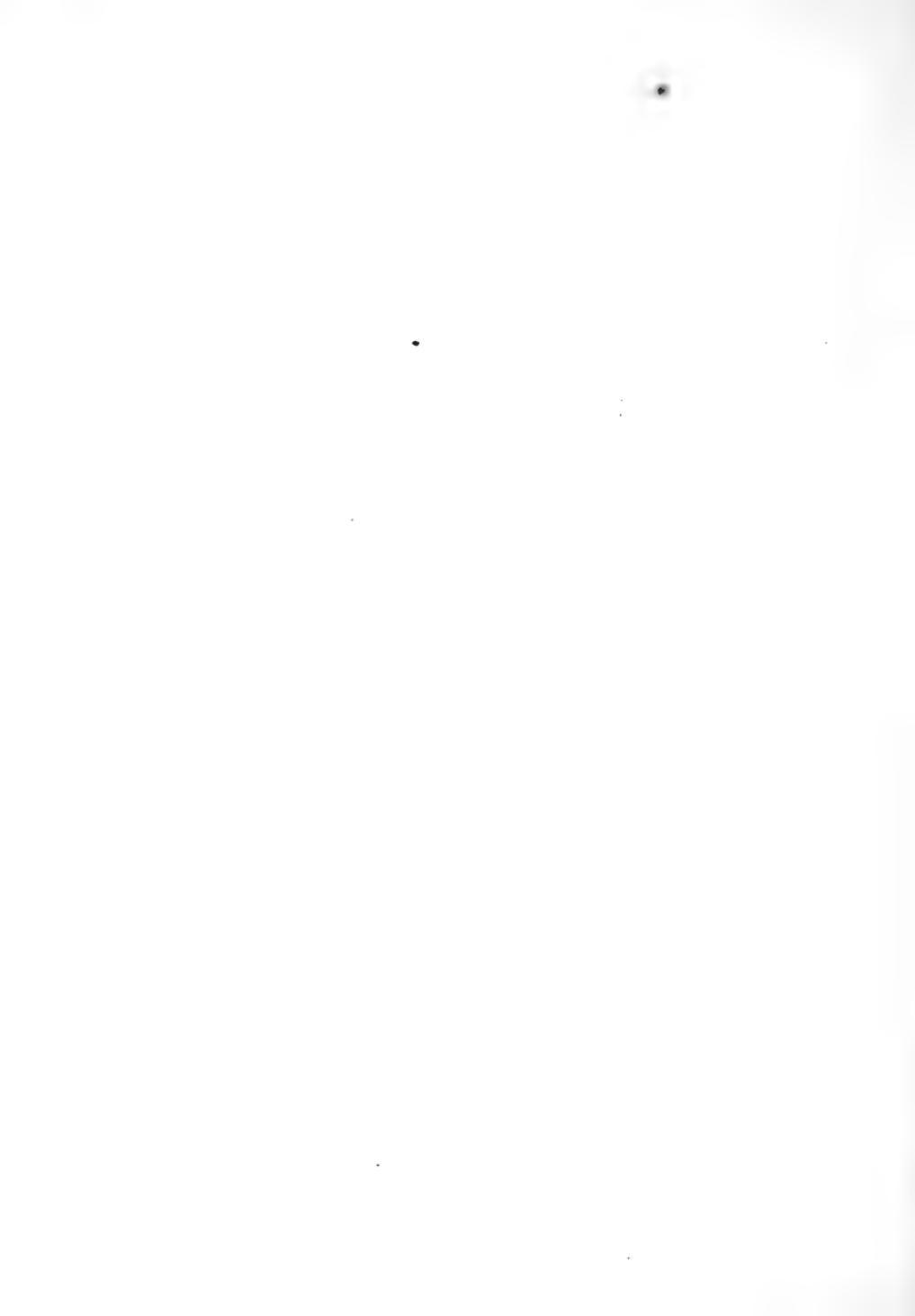


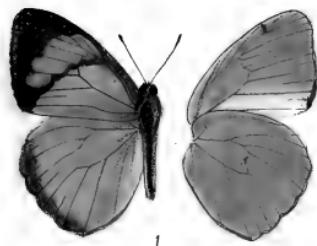




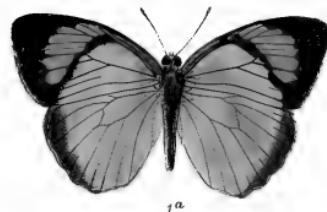








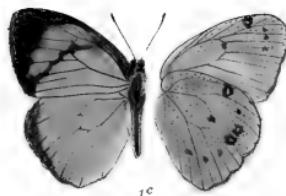
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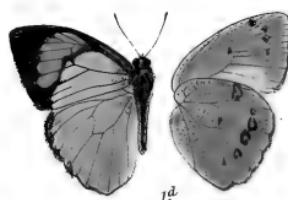
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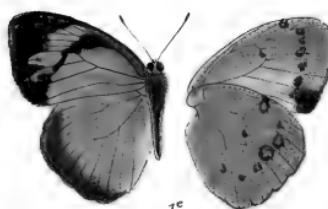
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1c



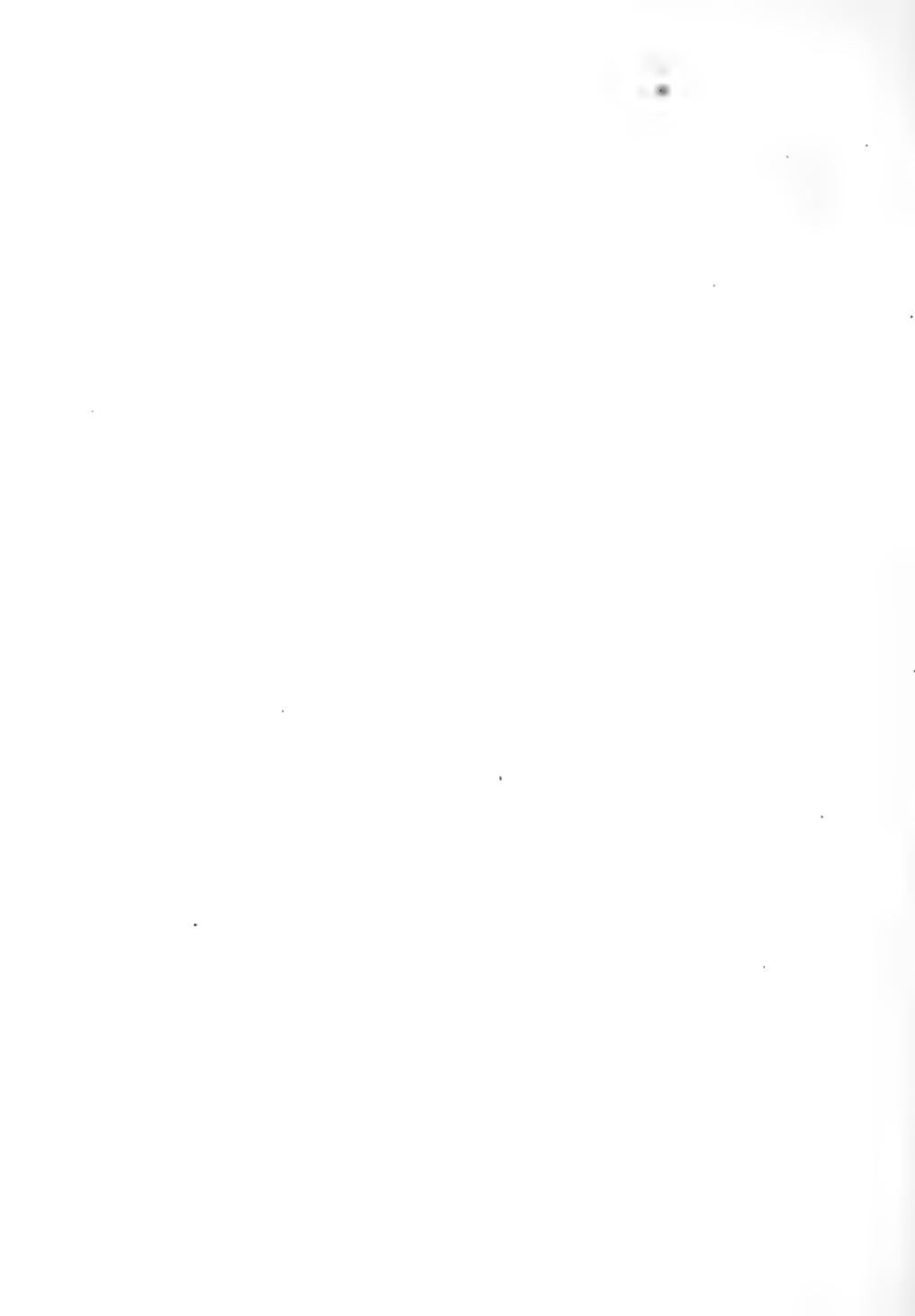
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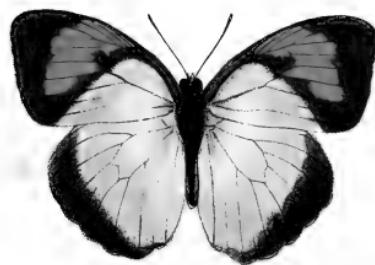


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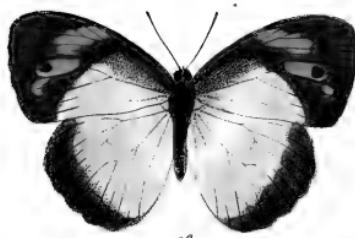


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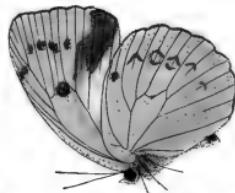




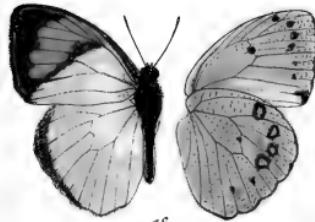
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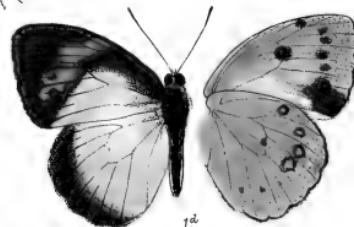
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1b.



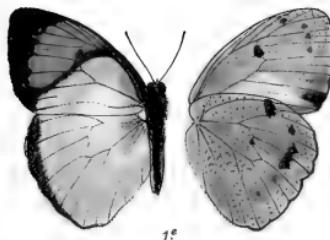
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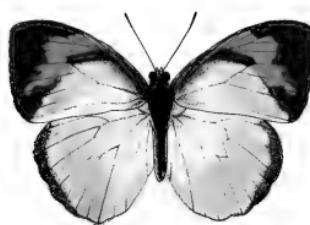
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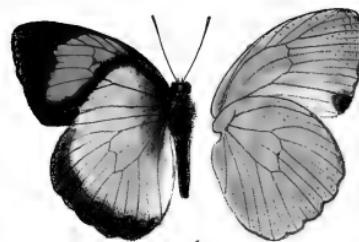


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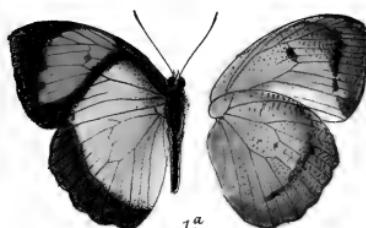


1f.

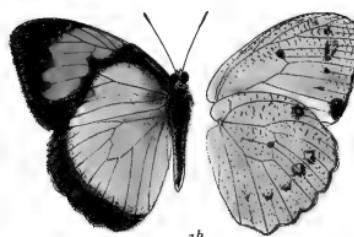




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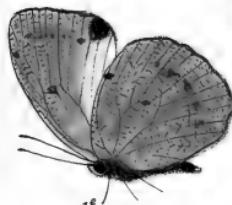
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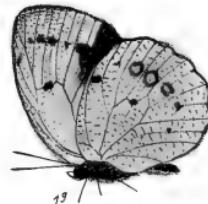
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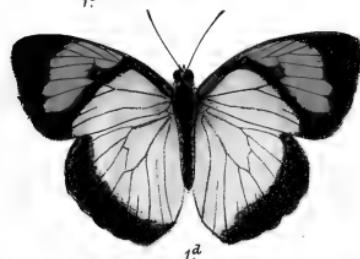
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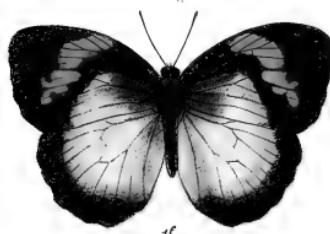
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1g

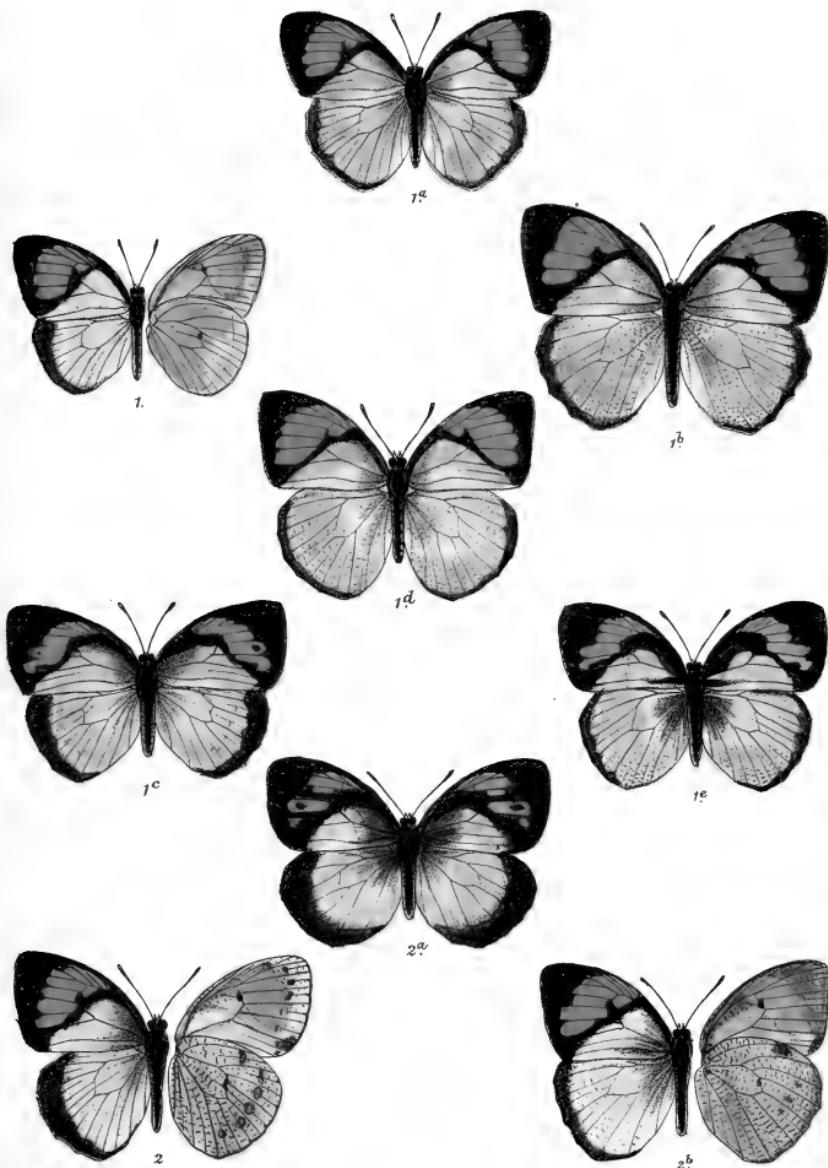


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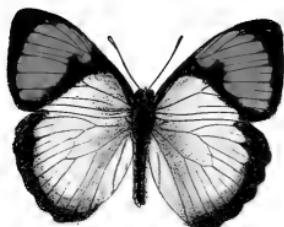


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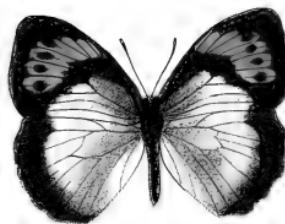




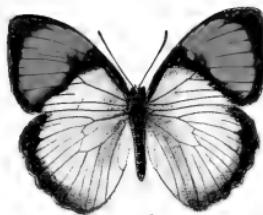




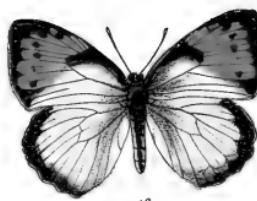
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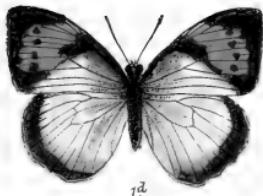
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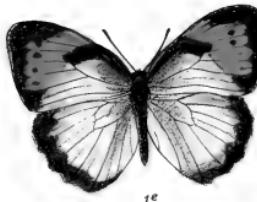
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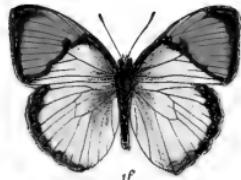
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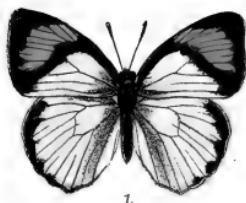


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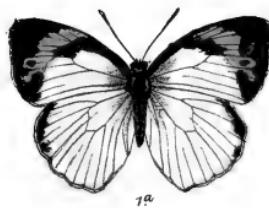


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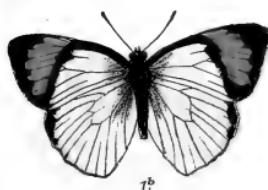




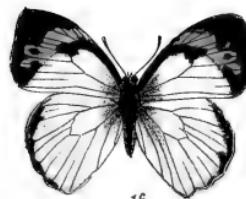
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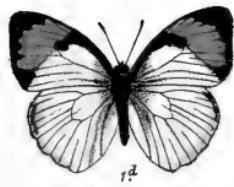
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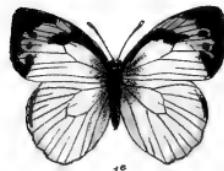
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1c



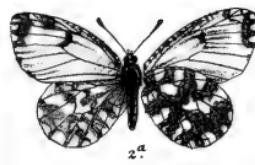
1d



1e



2



2a

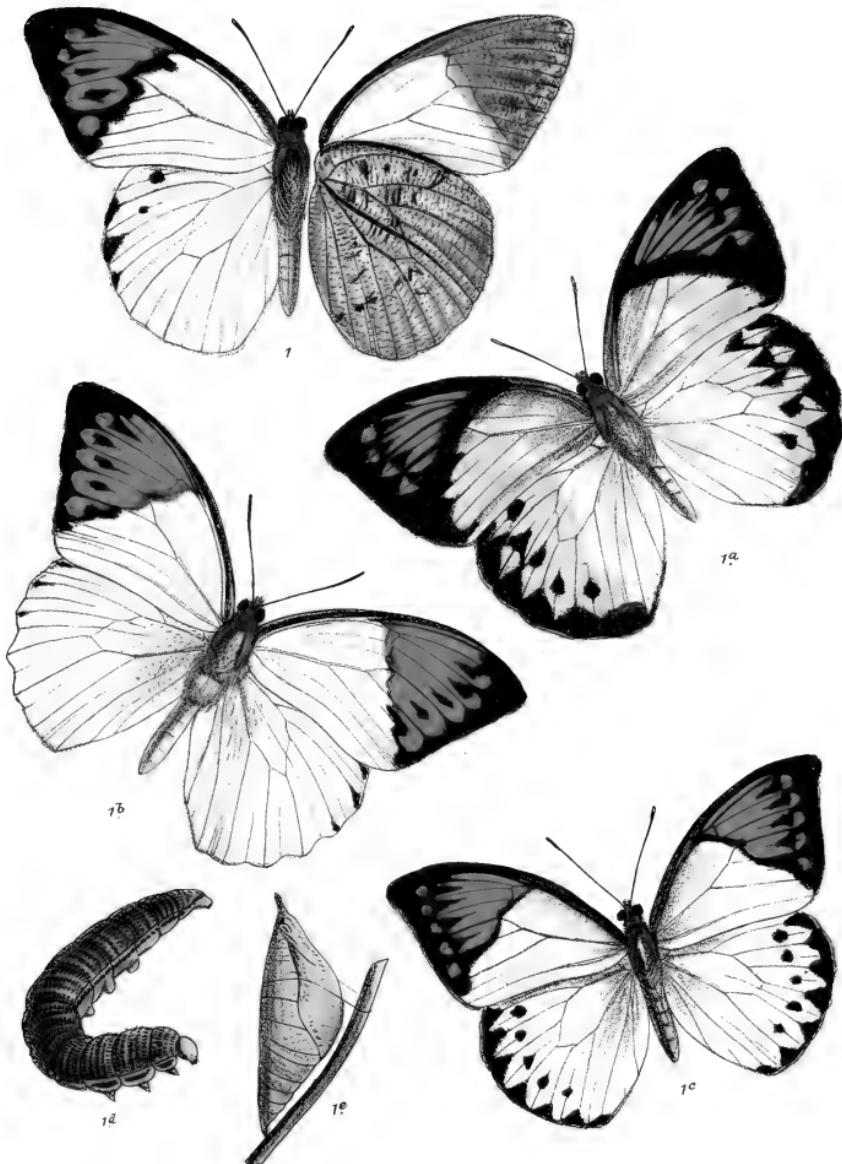


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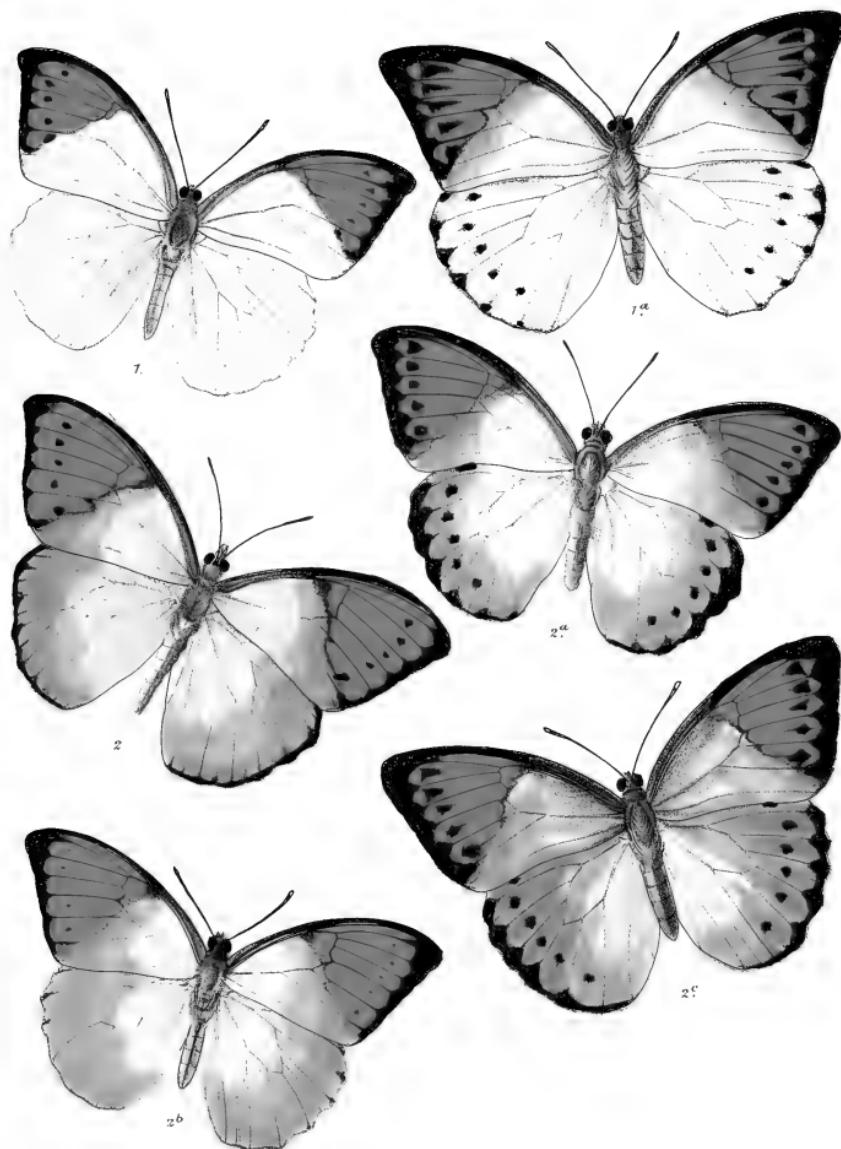


3a

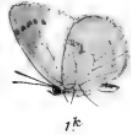
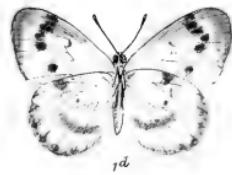
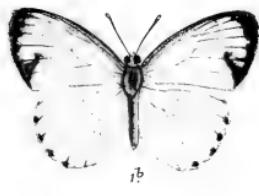
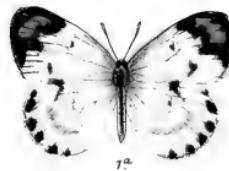




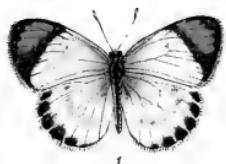




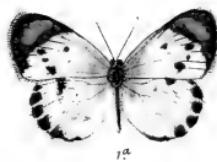




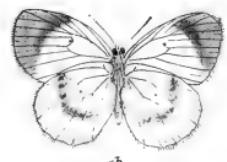




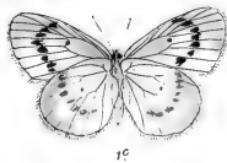
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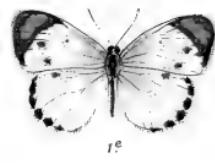
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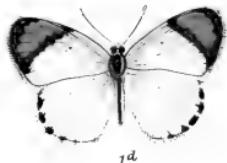
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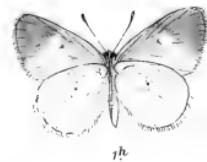
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6.



7.



8.



9.



10.



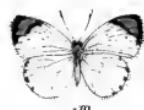
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12.

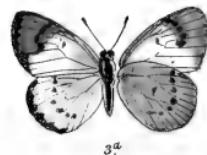
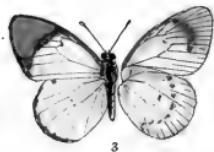
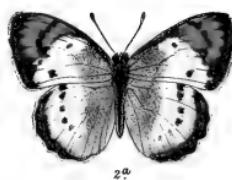
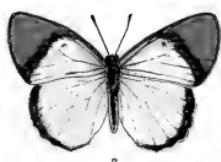
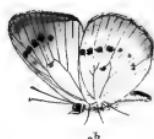


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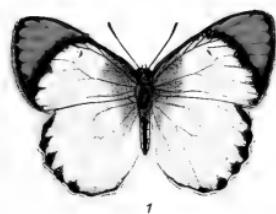


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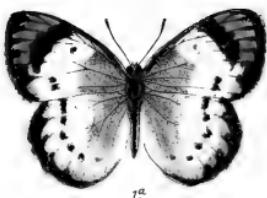








1



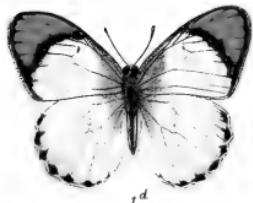
2a



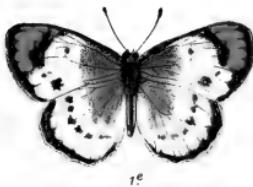
1b



1c



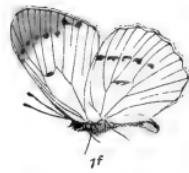
1d



1e



2j



1f



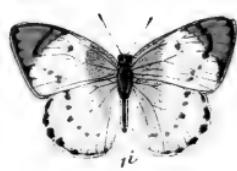
1g



1h



1k

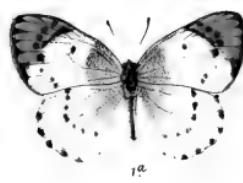


1i





1a



1b



1c



1d



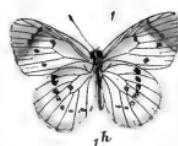
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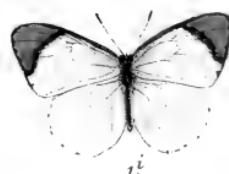
1f



1g

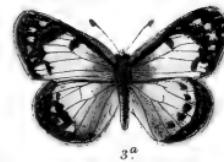
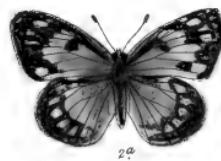
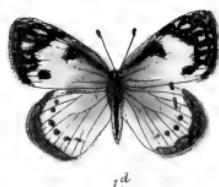
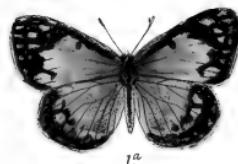


1h



1i









1.



1<sup>b</sup>



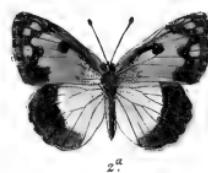
1<sup>a</sup>



2.



2<sup>b</sup>



2<sup>a</sup>



3.



3<sup>c</sup>



3<sup>a</sup>



3<sup>d</sup>



3<sup>b</sup>



3<sup>e</sup>



3<sup>f</sup>

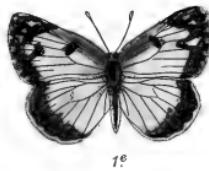


3<sup>c</sup>



3<sup>g</sup>









1.



1a.



1b.



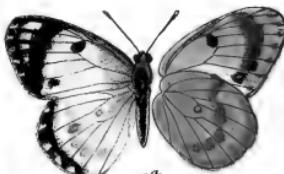
1c.



1d.



1e.



2a.



2b.

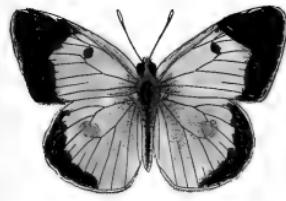


2c.

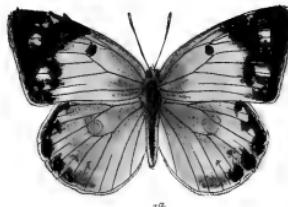


2d.

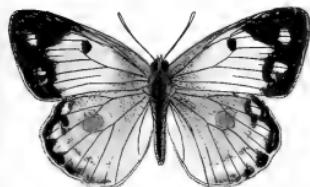




1.



1a



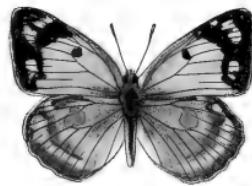
1c



1b



1d



1e



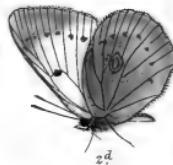
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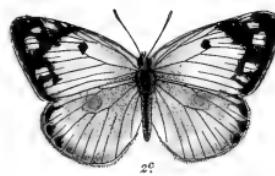
2a



2b



2d



2c





1a



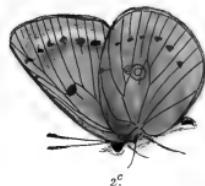
1b



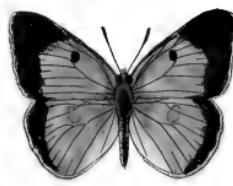
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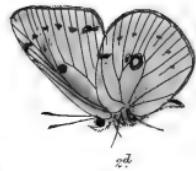
1d



2a



2b



2c



2d

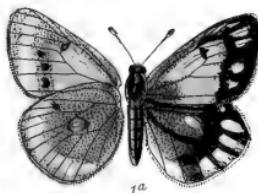


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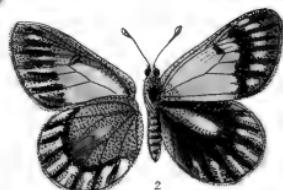




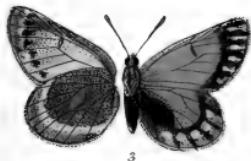
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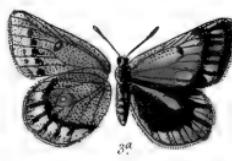
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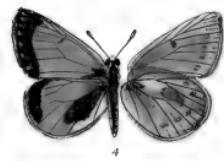
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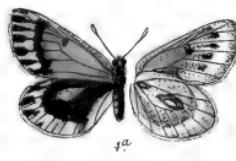
3.



3a.



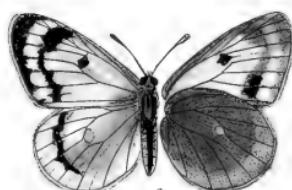
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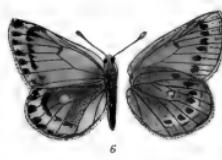
4a.



5.



5a.

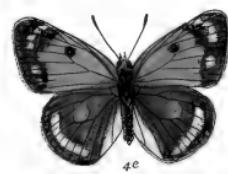
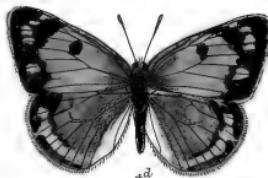
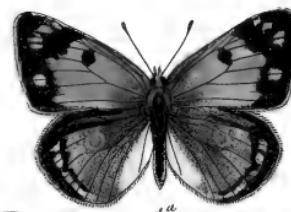
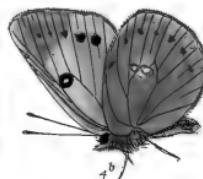
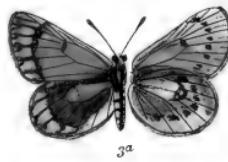
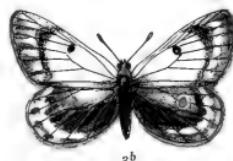
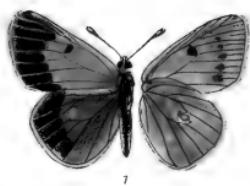


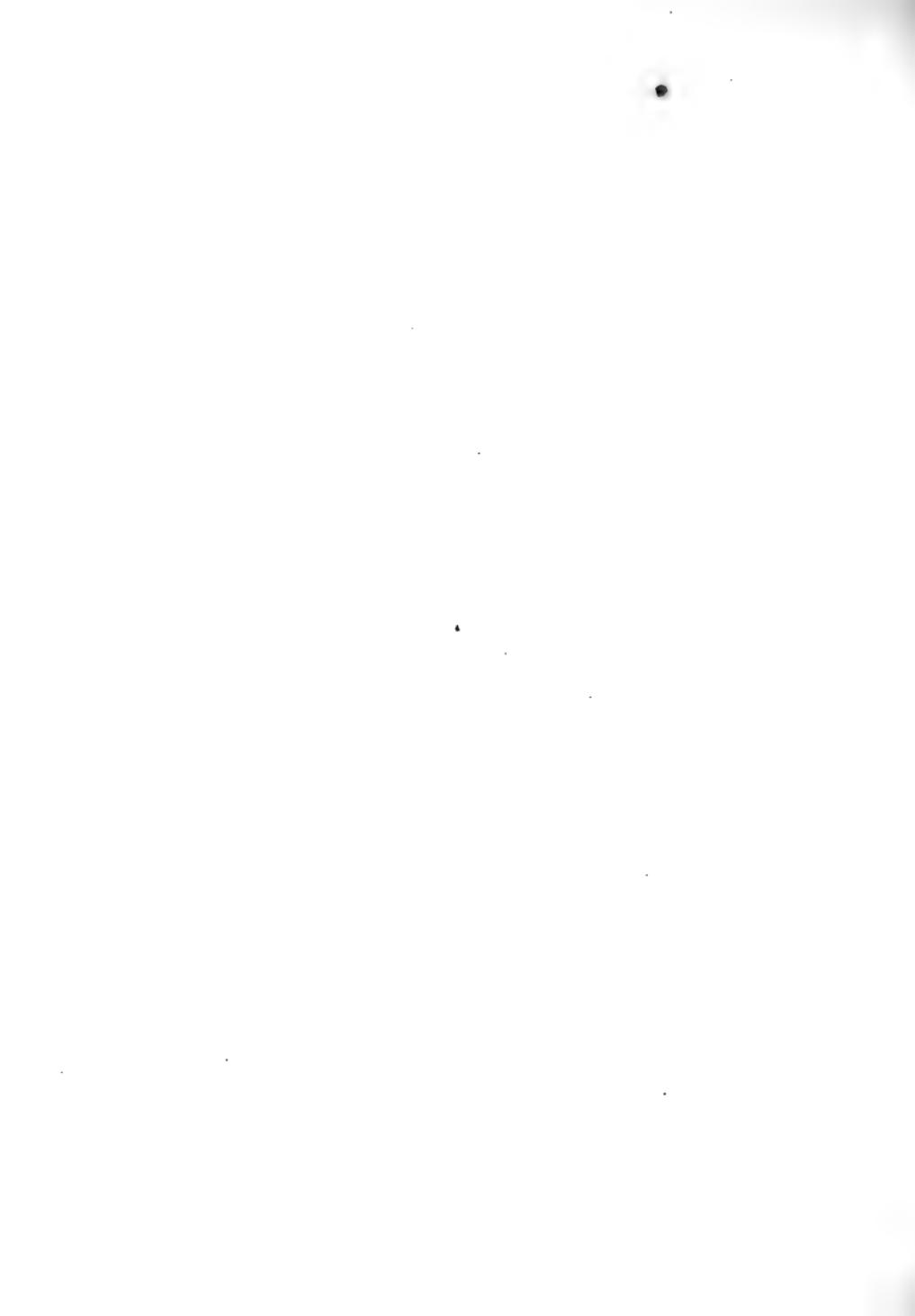
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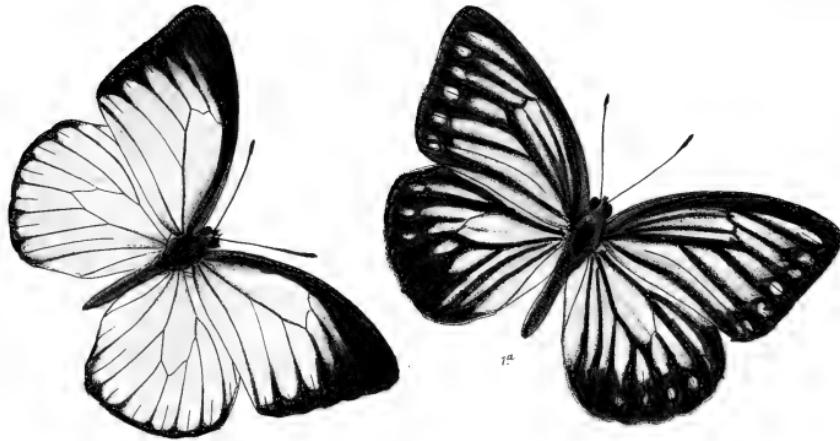


6a.



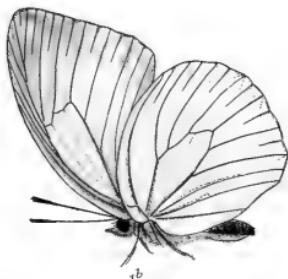




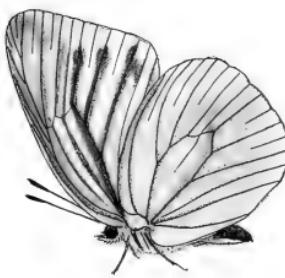


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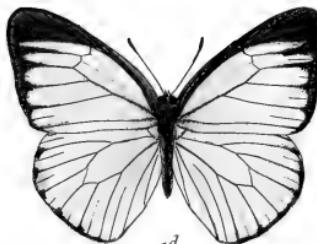
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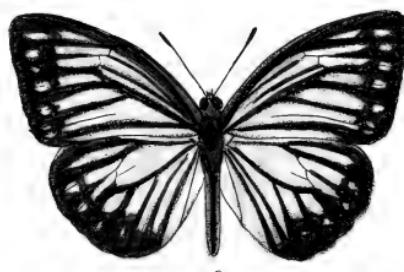
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1c.

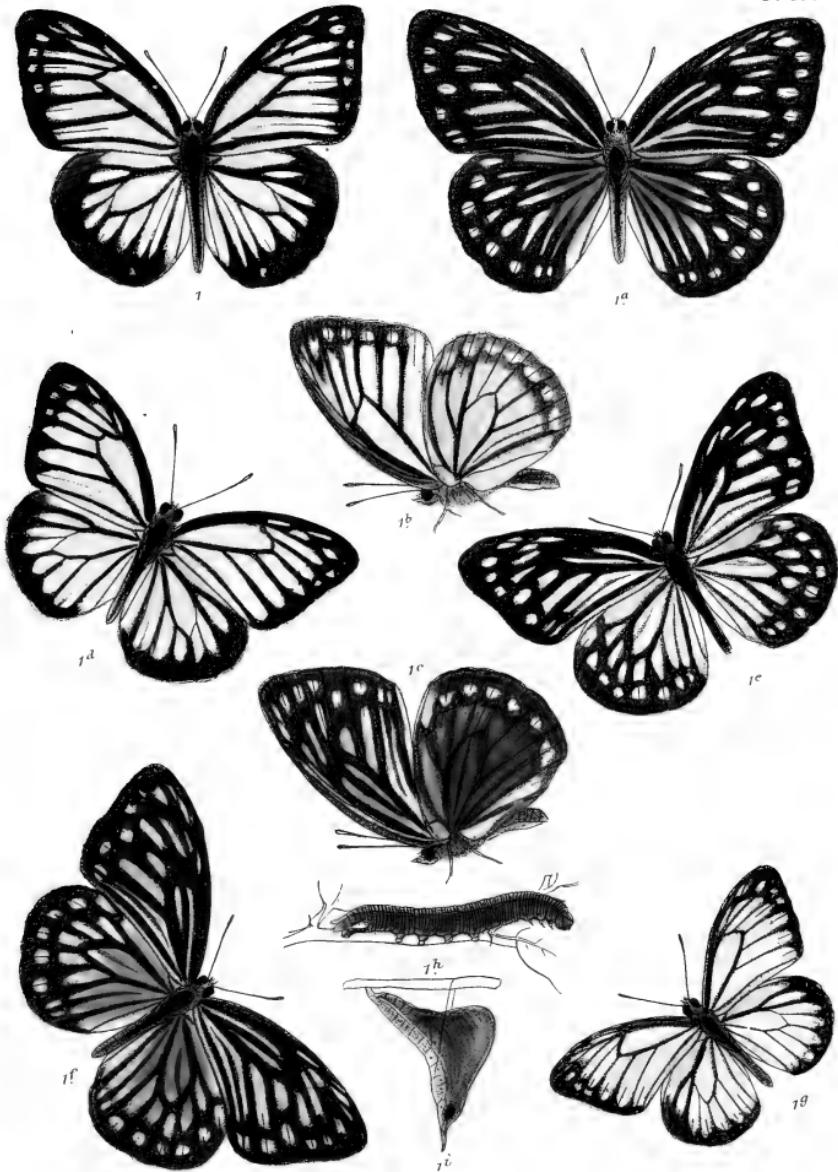


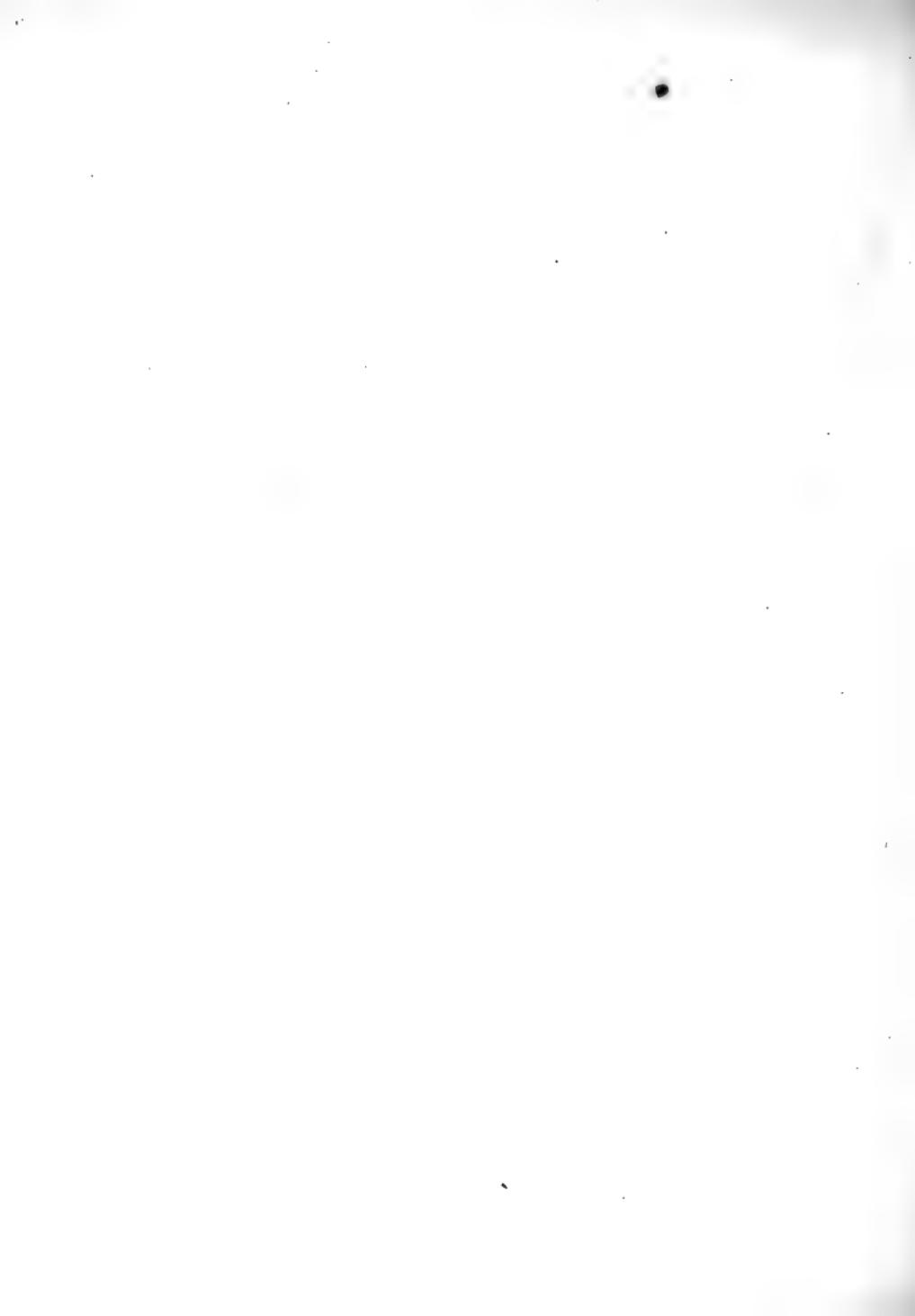
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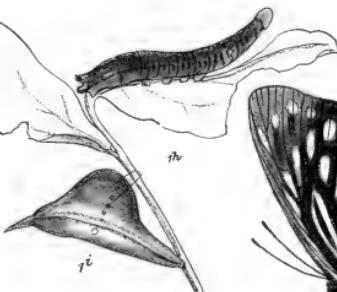
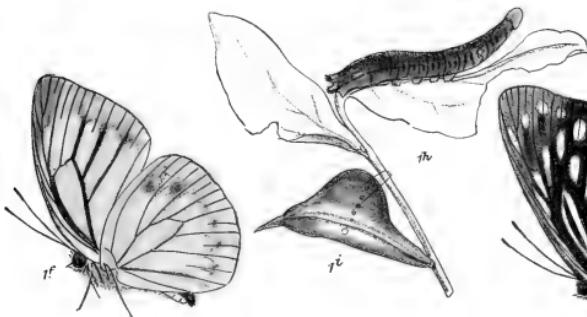
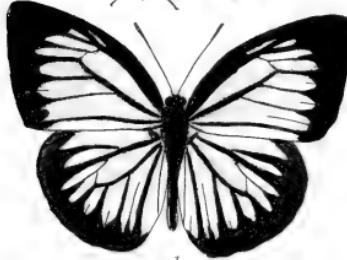
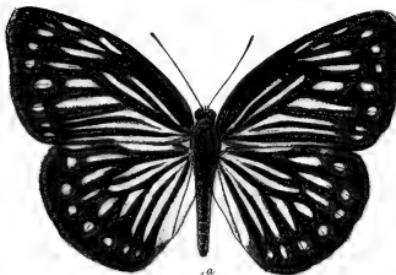
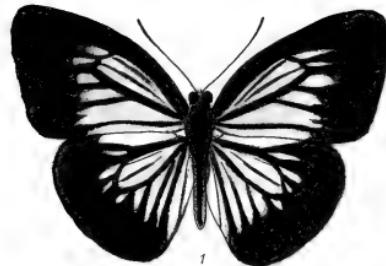


1e.

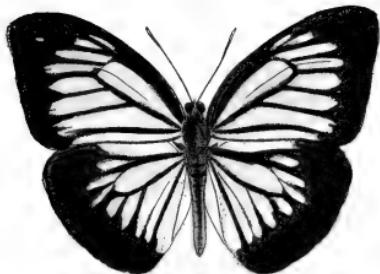




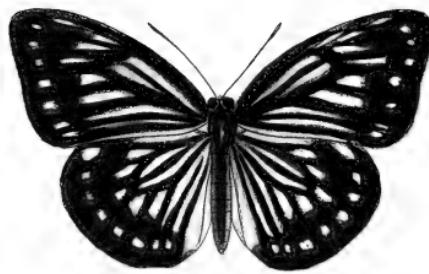








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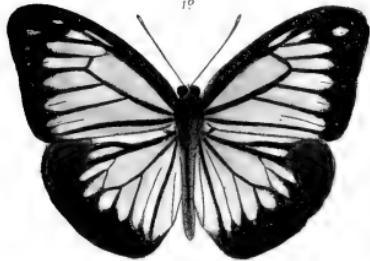
7a



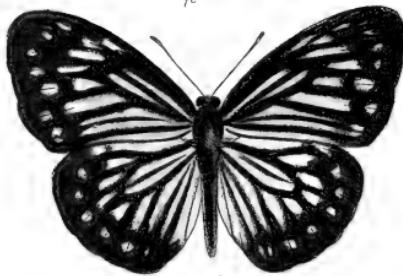
7b



7c



7d



7e

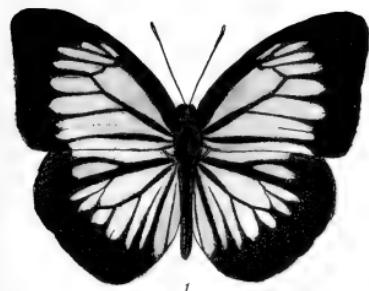


7f

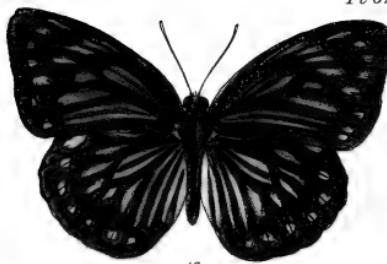


7g

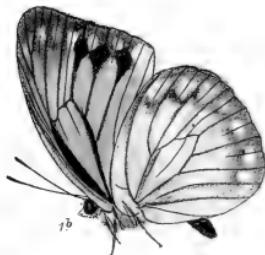




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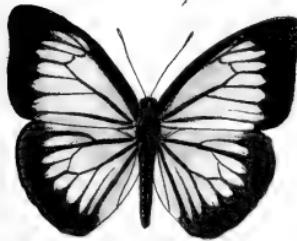
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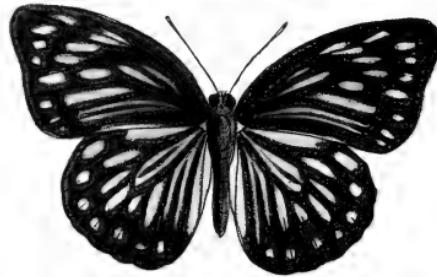
1b



1c



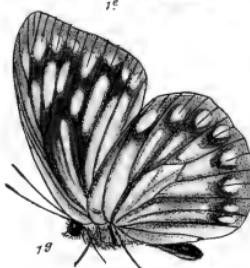
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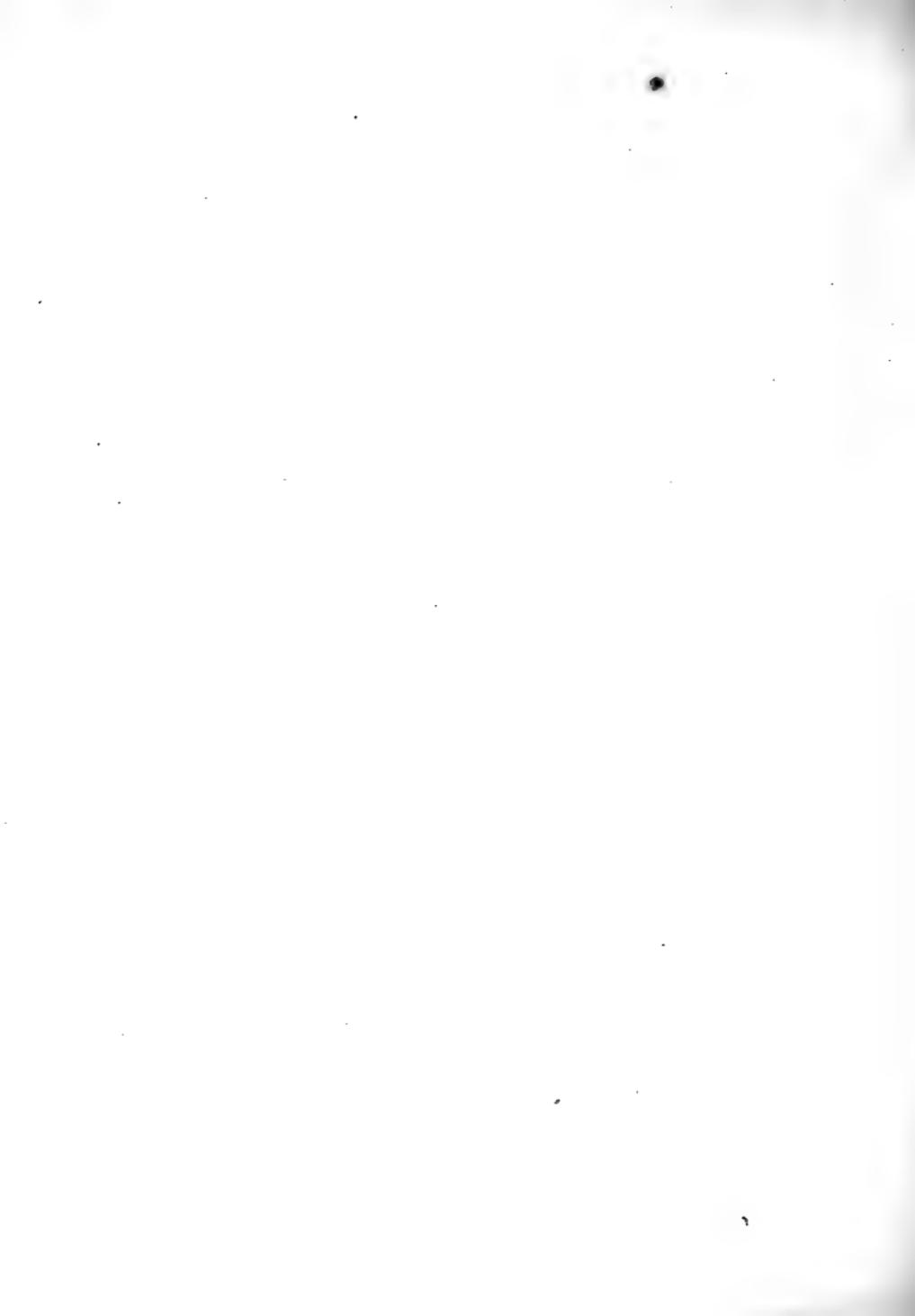
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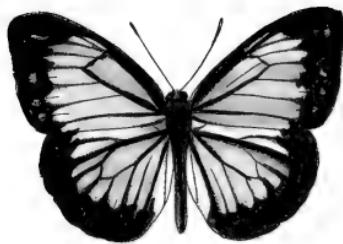


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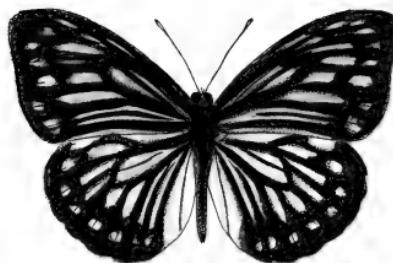


1g





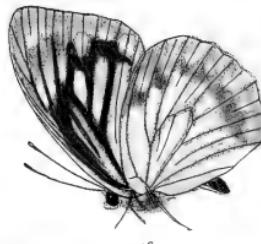
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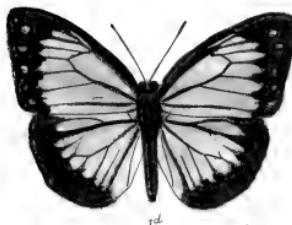
7a



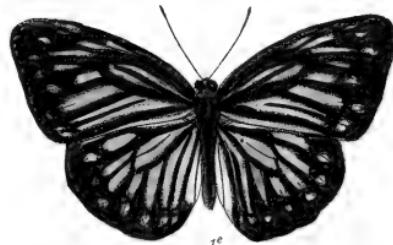
7b



7c



7d



7e



7f

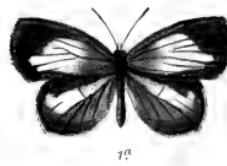


7g





1



1<sup>a</sup>



1<sup>b</sup>



2



2<sup>a</sup>



2<sup>b</sup>

E.C. Knobell del et hñ.



2<sup>c</sup>

Vincent Brooks Day & Son, Ltd, Imp.





1



7a



7b



7c



7d



7e



2



2a



2b



2c





1



1a



1b



1c



2



2a



2b



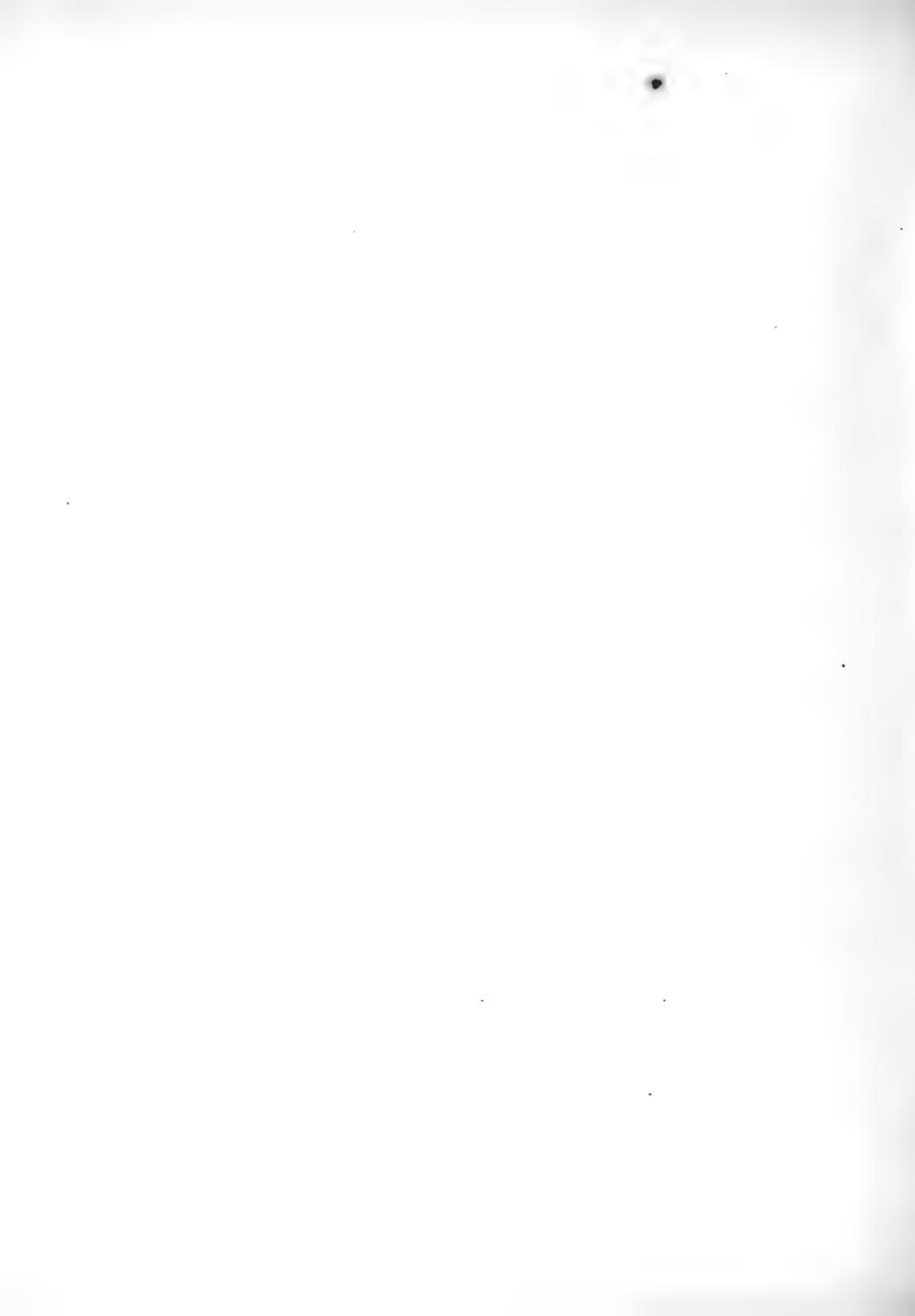
2c



3



3a





1



1<sup>a</sup>



1<sup>b</sup>



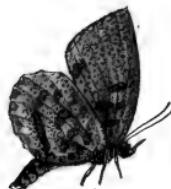
1<sup>c</sup>



2



2<sup>a</sup>



2<sup>b</sup>

E. C. Knight del. et lith.



Vincent Brooks, Day & Son Ltd. Imp.





1



1a



1b



2



2a



2b



3



3a



3b



3c





1



1<sup>a</sup>



1<sup>b</sup>



1<sup>c</sup>



2



2<sup>a</sup>



2<sup>b</sup>



2<sup>c</sup>





1



1<sup>a</sup>



2



2<sup>a</sup>



2<sup>b</sup>



2<sup>c</sup>



3



3<sup>a</sup>



3<sup>b</sup>



3<sup>c</sup>





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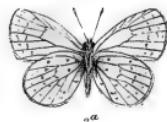
1a



2



1b



2a



3



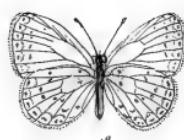
3a



3b



4



4a





1



1b



1c



1e



1f



1d



2



2b



2c



2e



2f



2d





1



1<sup>a</sup>



1<sup>c</sup>



1<sup>b</sup>



2



2<sup>a</sup>



3<sup>b</sup>



3



3<sup>a</sup>



3<sup>c</sup>



3<sup>d</sup>





1



1a



1b



2



2a



2b



2c



2d



3a



3

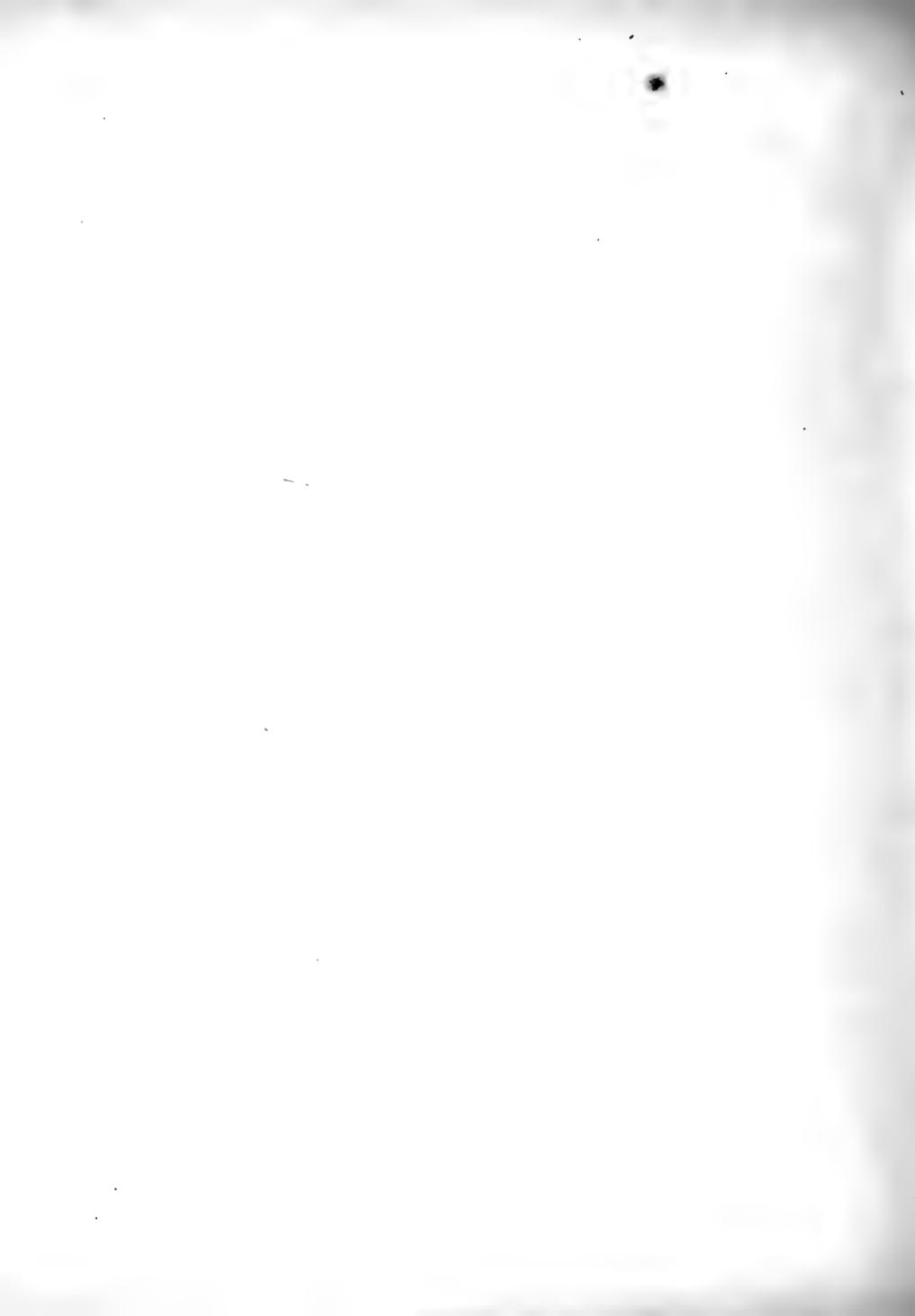


3b

Vincent, Brooks, Day & Son Ltd. imp.

E.C. Knight del et hth.

L. Reeve & C° London





1



1<sup>b</sup>



1<sup>a</sup>



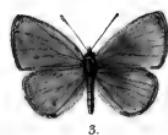
2



2<sup>b</sup>



2<sup>a</sup>



3.



3<sup>b</sup>



3<sup>a</sup>





1



1a



1b



1c



1d



1e



2



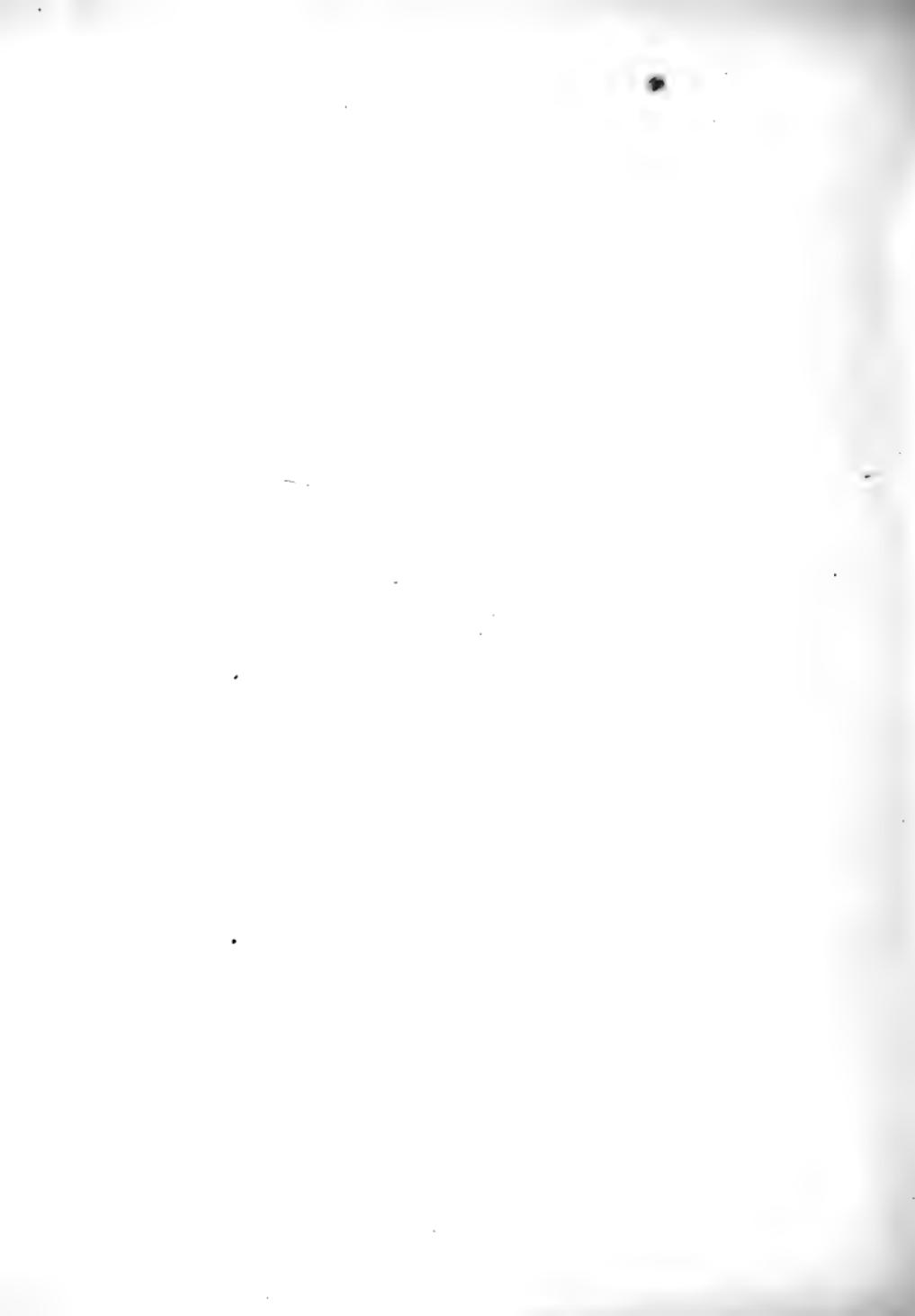
2a



2b



2c





7



7a



7b



2



2a



2b



2c



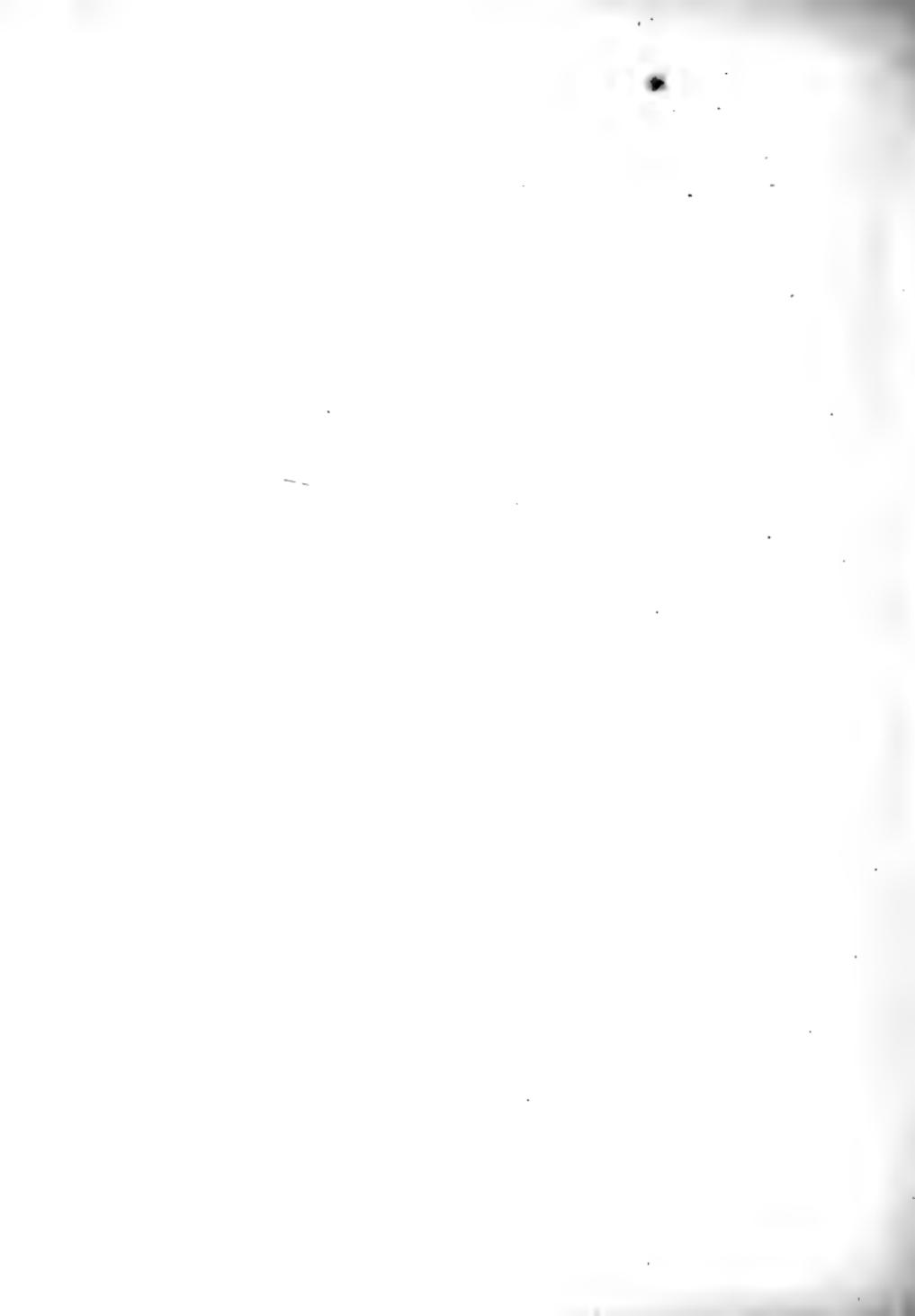
2d



3



3a





1



1<sup>a</sup>



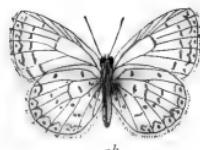
1<sup>b</sup>



2



2<sup>a</sup>



2<sup>b</sup>



3



3<sup>a</sup>



3<sup>b</sup>



3<sup>c</sup>



3<sup>d</sup>





1a



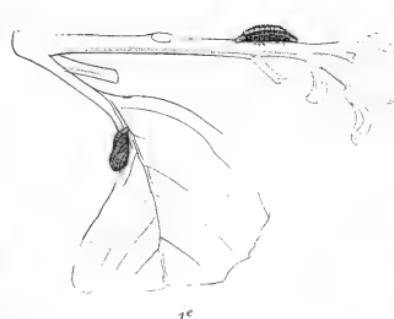
1b



1c



1d



1e



1f



2a



2b



2c



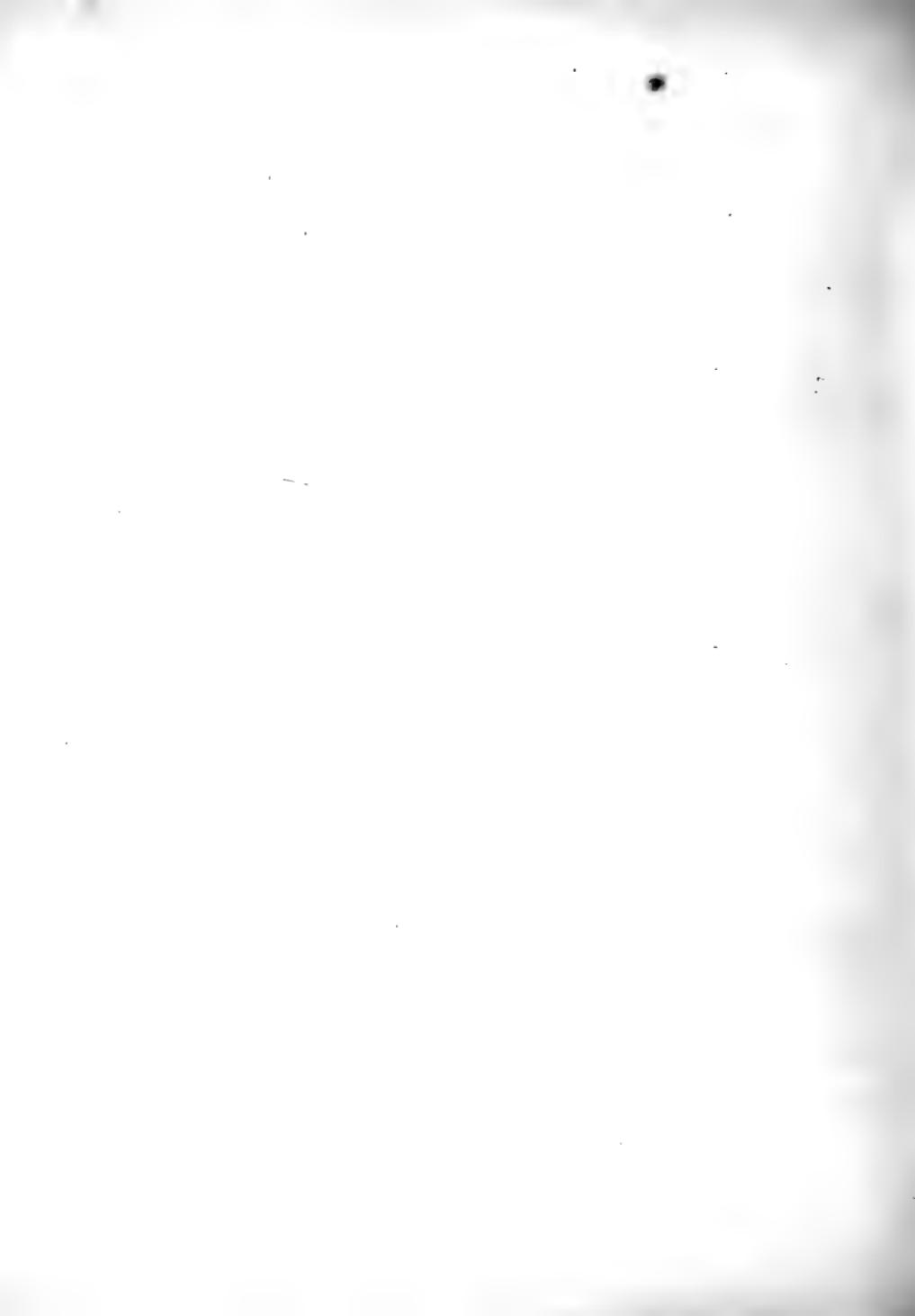
2d



2e



2f





1a



1



2a



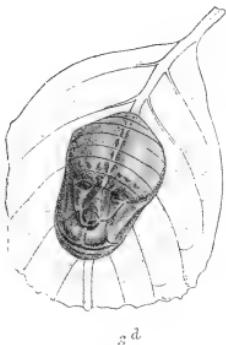
2



2b



3c



3d



3e



3



3f



3h





1



1a



1b



2



2a



2b



2c



2d



3



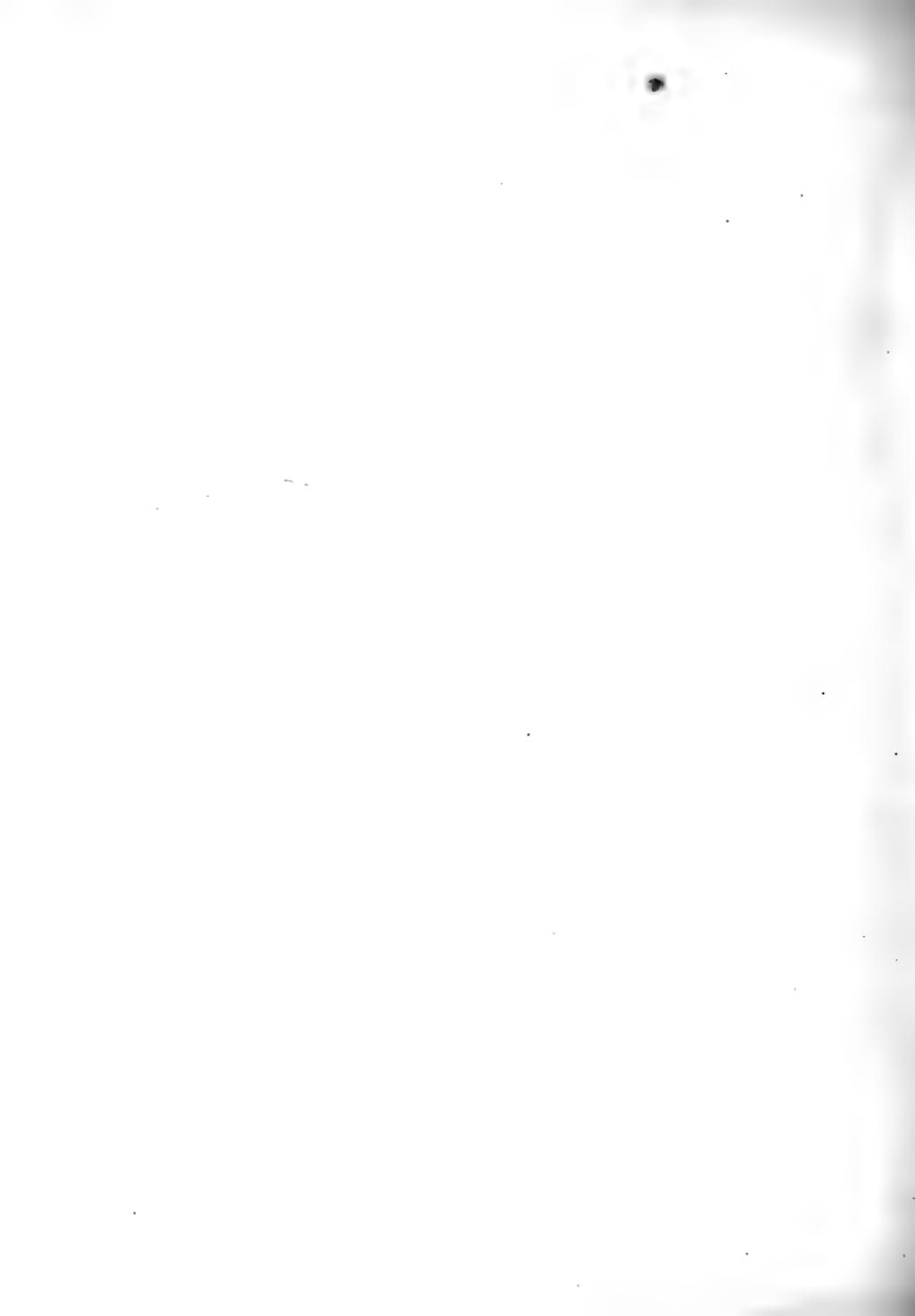
3b



3d



3c





1



1a



1b



1c



1d



1e



1f



1g



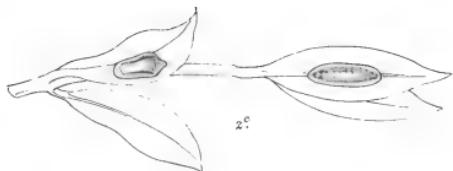
2



2b



2a



2c





1



1a



1b



1c



2



2a



2b



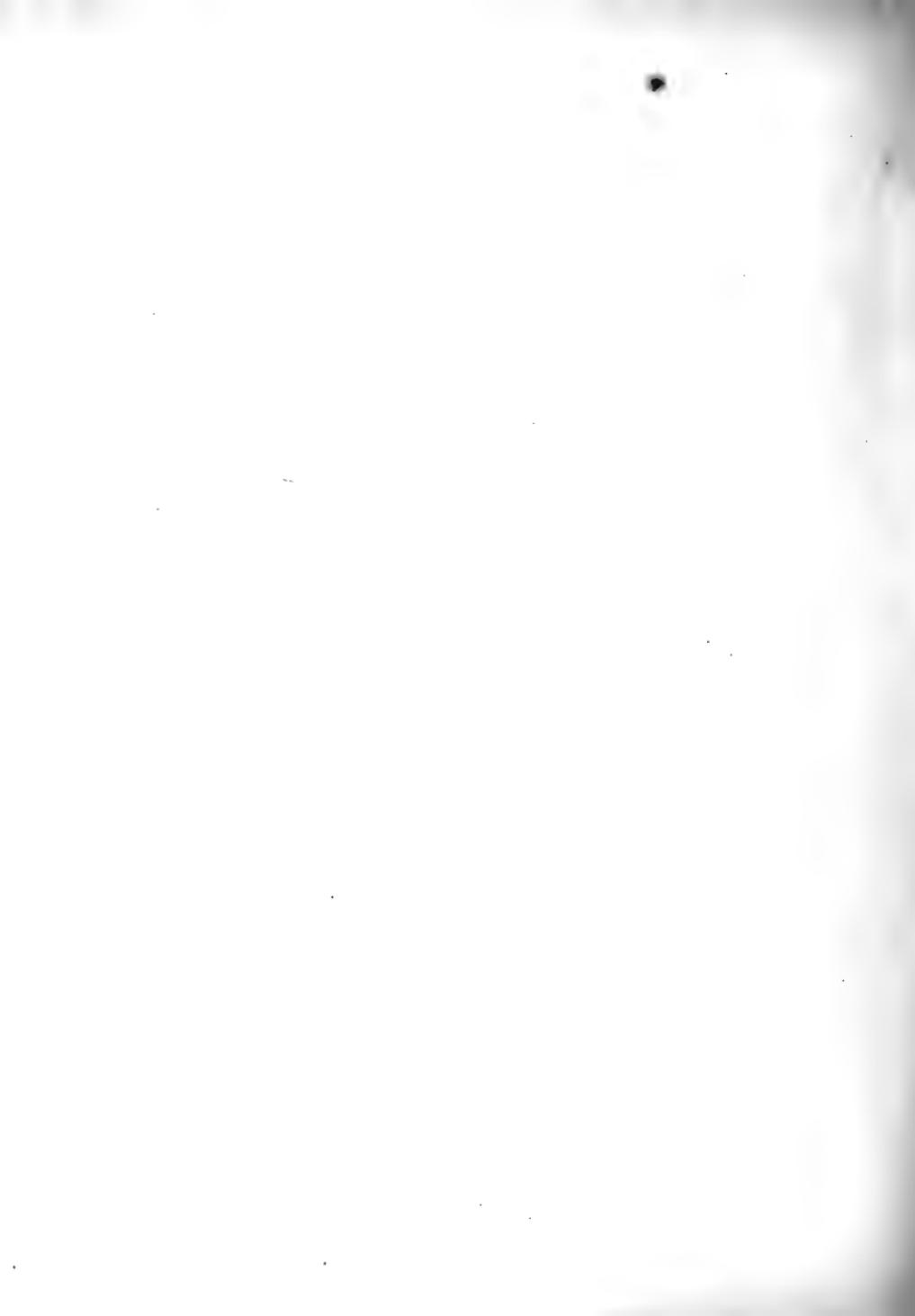
3



3a



3b





1



7<sup>a</sup>



1<sup>b</sup>



7<sup>c</sup>



2



2<sup>a</sup>



2<sup>b</sup>



2<sup>c</sup>



2<sup>d</sup>



2<sup>e</sup>





1



1'



1'



1'



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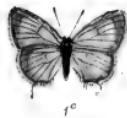
1.



1a



1b



1c



1d



1e



1f



1g



3.



1h



3a



3b



3c



3d





1



1<sup>a</sup>



1<sup>b</sup>



1<sup>c</sup>



1<sup>d</sup>



2



2<sup>a</sup>



2<sup>b</sup>



2<sup>c</sup>



2<sup>d</sup>



3



3<sup>a</sup>



3<sup>b</sup>



3<sup>c</sup>



3<sup>d</sup>





1



1<sup>a</sup>



1<sup>b</sup>



1<sup>c</sup>



1<sup>d</sup>



2<sup>b</sup>



2



2<sup>a</sup>



3<sup>b</sup>



3



3<sup>a</sup>





1



1a



1b



1c



1d



1e



2b



2



2a



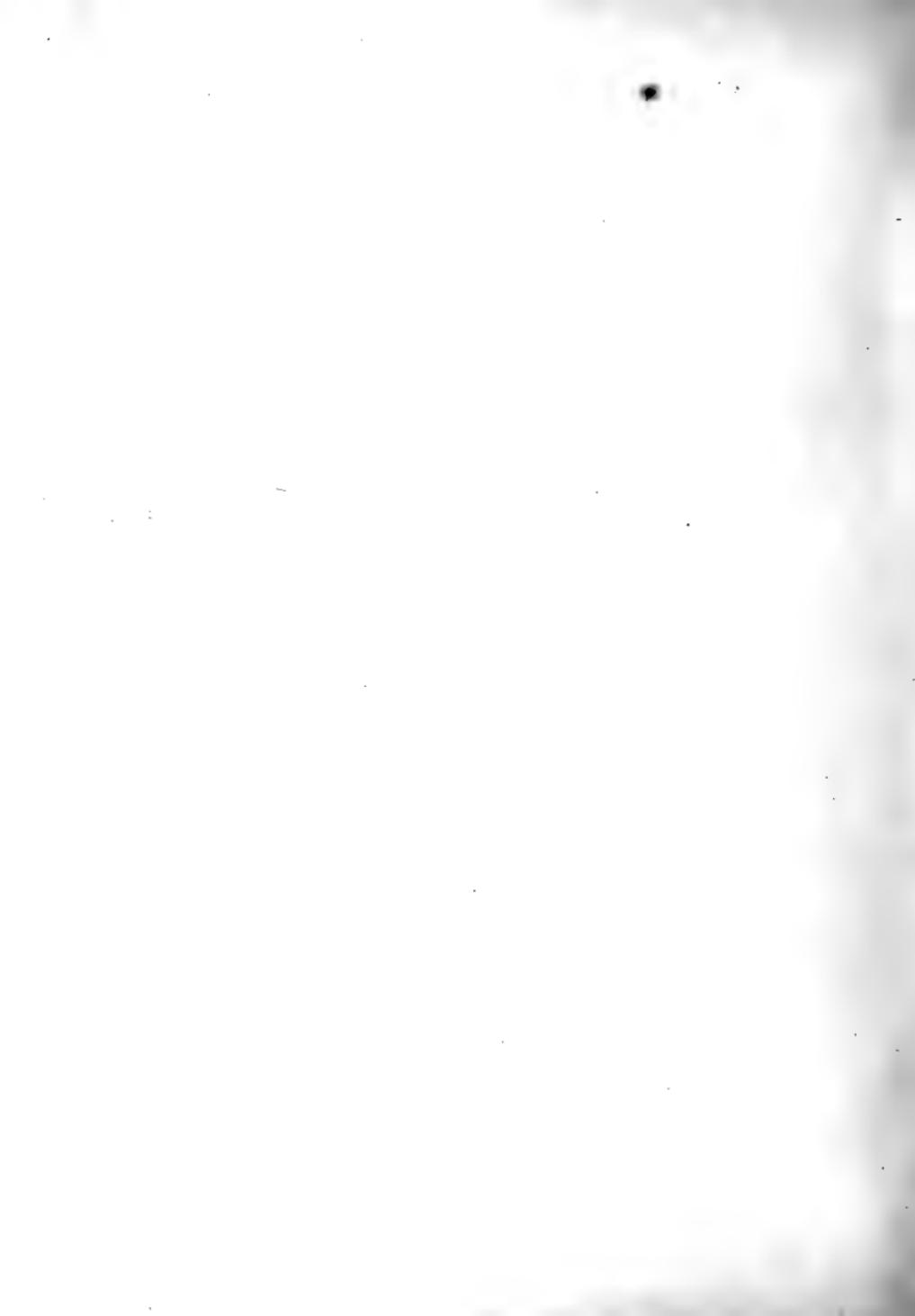
3b



3



3a





1



1<sup>a</sup>



2



1<sup>b</sup>



2<sup>a</sup>



2<sup>b</sup>



3



3<sup>a</sup>



3<sup>b</sup>



3<sup>c</sup>



3<sup>d</sup>



3<sup>e</sup>



3<sup>f</sup>





1



1b



1a



2



2b



2a



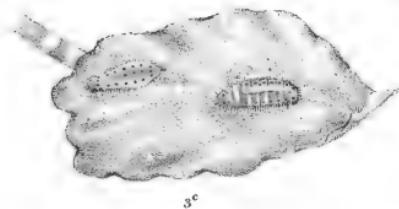
3



3b



3a



3c



4



4b



4a









